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Metallurgical Coke from Illinois Coal*

Operating Test at the St. Paul Plant of
Minnesota By-Product Coke Co. Conducted
by the Bureaus of Standards and Mines

BY R. S. M'BRIDE AND W. A. SELVIG

THE great importance during the war period of substituting mid-continent coal for coals from more distant sources even in by-product coke-oven work was well recognized. The Bureau of Standards was ordered to conduct an investigation of a new coke-oven process claimed to be especially suited to this purpose and in connection with this the bureau was requested to conduct a test of the St. Paul plant of the Minnesota By-Product Coke Co., which is owned by the Koppers Co., Pittsburgh.

The Bureau of Standards in co-operation with the Bureau of Mines carried out this operating test, using about 7600 tons of coal from the Orient mine, Franklin County, Illinois. All phases of coal-handling, by-product recovery and laboratory tests were under observation by the staff of 37 Government engineers and chemists employed on the work. In addition, those in charge had the benefit of advice and comment from a considerable number of experts who are specialists in the field of coke-oven operation.

The quantity of all coal used and of all by-products obtained was carefully weighed or measured at regular intervals and samples of each material were taken for analysis. The Bureau of Standards was responsible for the general planning and supervision of the test work. Its representatives made all observations of battery operation, high temperature measurements, by-product recovery and chemical laboratory work on gas and by-products. The Bureau of Mines was re-

sponsible for the sampling of the coal both as it was loaded at the mine and as dumped at the plant. It supervised the weighing, coal-handling coke-handling and coke-sampling operations and made all analysis of coal and coke. Its representatives also made general observations on the character of the coke and operation of the ovens.

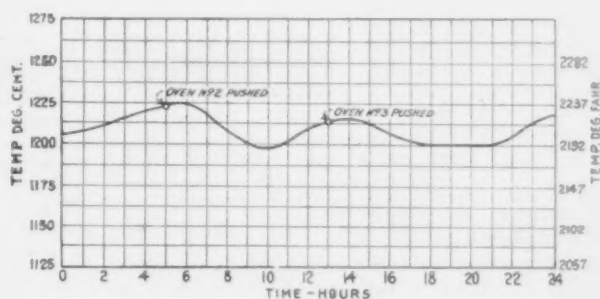
The Minnesota By-Product Coke Co.'s plant

consisted of 65 ovens of 18 1/4 in. average width, operating during the test period with an average gross coking time of 19 hr. and 33 min. with coal finely pulverized, 12.75 tons per oven as charged. The temperature of the heating wall as determined by rare-metal thermocouples averaged about 1200 deg. C. during the test period. The coke was screened to produce large and small furnace sizes; stove, nut, and pea, "domestic" sizes, and breeze. The gas was separated into rich and lean at the battery. Separate test records were kept of each size of coke and of each quality of gas. Practically all of the ammonia produced was made up into sulphate immediately through the direct recovery process. Although the plant operated for

the production of pure light-oil products, only the total production of light oil was measured, but the yield of various constituents was determined by analysis.

Coal Used

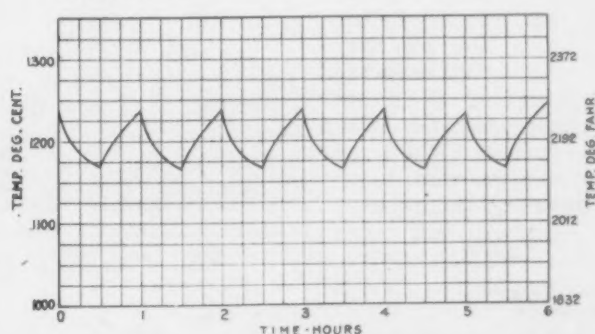
The coal was apparently clean and very well screened. The impurities consisted of a small amount of pyrite, mostly in the form of thin layers, calcite, mother of coal and shale. The coal was crushed at the plant with the intention of making it as fine as was feasible with the apparatus available. As charged to the ovens, over



WALL TEMPERATURE FLUCTUATIONS IN A BY-PRODUCT COKE OVEN

The upper curve shows the record of the temperature at a point 7 ft. below the top of the battery between ovens Nos. 2 and 3 and indicates the effect of charging and pushing.

The lower curve shows the effect of reversals.

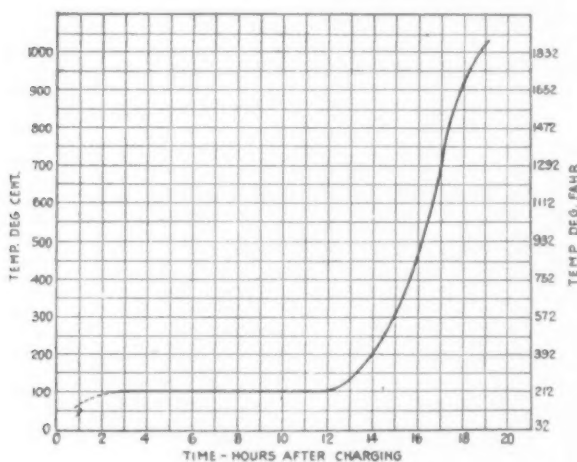


*Published with permission of the director of the Bureau of Standards; full report will appear as Bureau of Standards Technologic Paper No. 137. Dr. McBride is engineer-chemist, Bureau of Standards, and Mr. Selvig assistant chemist, Bureau of Mines.

95 per cent passed through a 4-mesh sieve, and about 2/3 passed through a 10-mesh sieve.

A composite sample of the crushed coal sampled from the conveyor belt was made up from the daily plant samples and analyzed according to the laboratory methods described in Bureau of Mines' technical paper No. 8; the results are presented in Table 1.

High temperature measurements were made continuously for several days during the test period in order to give an accurate idea of the operating conditions of the battery. Records were taken of the temperature in the oven walls, regenerators, waste-heat flue, in the coal mass and in the vapor above the coal. Measurement of high



Average of Coal Temperature Curves

temperatures in a by-product coke oven is attended with great difficulty because of the inaccessibility of certain points where temperature measurements are desirable and because of the limited variety and high cost of apparatus which can be used for these purposes. The results obtained are sufficient, however, to give an accurate idea of the range and average temperature maintained at the important points in the heating system.

Coke Produced

The coke produced was very irregular in size, had a longitudinal fracture, was fingery, brittle and shattered easily. The cell structure was very small and regular. The coke was lighter than the average by-product coke, weighing only 23 lb. per cubic foot. Table No. 2 summarizes the characteristics and yield of this coke further. The large percentage of domestic sizes obtained and therefore the unusually small percentage of furnace size demonstrates that the coke will not stand handling and screening without breaking up into many smaller sizes. This is due primarily to its fingery and brittle characteristics.

The yields of gas and by-products are summarized in Table No. 3. The results of coke analyses on a composite sample of the furnace size are given in Table No. 4.

Blast Furnace Test of Coke

In order to test the behavior of the furnace-size coke produced from the Orient coal in the St. Paul plant, arrangements were made to use some of this material in the blast furnace plant of the Mississippi Valley Iron Co., St. Louis. The Bureau of Standards and the Bureau of Mines were each represented at the furnace test, but their representatives acted only as observers, having no part in the furnace operation. Also F. W.

Sperr, Jr., chief chemist, and C. R. Meissner, experimental engineer, Koppers Co., were present during a considerable portion of the test period as observers.

It was first planned to make a one-week operating test, but after beginning the test additional coke was ordered and 1746 tons of coke were actually used in the furnace. This material was approximately equally divided between that shipped direct from the St. Paul test as loaded on the cars from the screening station and that reclaimed from the stock pile in which the coke during the first part of the test at St. Paul was stored. The coke shipped direct from the screening station was considerably larger than that reclaimed from the stock pile, as it had not been subjected to the unusually rough treatment of dumping into a concrete pit, recovery by crane for transfer to the stock pile and a second handling by crane for reloading in freight cars.

The large coke was used during the first period of the test and the smaller during the latter portion. During the interval from 1.00 p. m. on Oct. 19 to 4.30 a. m. on Oct. 29, only this special coke was used in the furnace.

The plant of the Mississippi Valley Iron Co. consists of one blast furnace with auxiliary equipment. A modern gas-cleaning system has been installed but is not yet in use. Four of the five hot blast stoves are old and because of their condition limit the furnace capacity. The furnace was relined in accordance with the most modern practice and blown in blast on Aug. 5, 1916, previous to which date it had been out of blast for about five years.

The furnace is 77 ft. from hearth to top, 12 ft. 8 in. hearth diameter, 15 ft. 9 in. bosh diameter, 14 ft. 6 in. bosh height, and built with a bosh angle of 83 deg., which is said to be the steepest in this country. Although the furnace is rated at 300 tons of iron per day, the limitations of the hot blast stoves, blowing engines, etc., have always prevented operation at any such capacity. The output is generally materially less than 200 tons of pig iron per day. However, the height of the furnace is such that results on it correspond more nearly to those of a modern 500-ton furnace than would usually be the case for a plant of this capacity.

The coke regularly used in the furnace is produced in the Koppers ovens of the Laclede Gas Light Co., St. Louis, from a coal mixture of Elkhorn 65 per cent, Illinois 20 per cent, and Pocahontas 15 per cent. The substitution of the Illinois coke for the regular coke was accom-

Table 1.—Coal Analysis and Heating Value

	As Charged, per cent	Dry Basis, per cent
Moisture	8.07	...
Volatile matter	34.66	37.70
Fixed carbon	48.88	52.63
Ash	8.89	9.67
Sulphur	1.04	1.13
Hydrogen	5.32	4.81
Carbon	67.51	73.44
Nitrogen	1.49	1.62
Oxygen	15.75	9.33
Sulphur in fixed carbon from volatile determination	0.51	0.55
Heating value:		
Calories, per kg.....	6677	7263
British thermal units, per lb.....	12019	13073

plished abruptly and continued without interruption throughout the test.

The ores used during the test were Beaver, Waukon and Beaver manganese from the Minnesota ranges, and Pilot-Knob a local Missouri ore.

The first three of these ores are soft and rather earthy, but the Pilot-Knob is a very hard refractory lump ore. The limestone used throughout the test is known locally as McLoon.

At the beginning of the test the furnace was making malleable iron, but during the later stages

Table 2.—Coal and Coke Summary

Coal used, tons:	
As charged	7685.6
Dry	7065.4
Ovens charged	603
Coal per oven, tons:	
As charged	12.75
Dry	11.72
Coking time, hr. and min.:	
Average gross	19:33
Average net	19:11
Coke produced (dry), tons:	
Furnace	2704.4
Stove	1178.1
Nut	549.5
Pea	89.9
Breeze	308.4
Total	4830.3
Ratio of dry coke to dry coal, per cent:	
Furnace	38.3
Stove	16.7
Nut	7.7
Pea	1.3
Breeze	4.4
Total	68.4
Sizes of coke produced, per cent:	
Furnace	56.0
Stove	24.4
Nut	11.4
Pea	1.8
Breeze	6.4
Total	100.0

the furnace was run to make basic iron, as it was believed that this would be a more severe test of furnace performance.

Each day during the test the significant data were tabulated and operating notes recorded by the various observers present. These data sheets were submitted and approved by the furnace operators as a record of the test.

During the test period a large number of operating irregularities occurred which subjected the coke to a great variety of conditions unfavorable to efficiency. The importance of these factors is made clear in the conclusions reached by the several observers as presented in the following section of this report. It was especially unfortunate that delay in securing the coke ordered for the latter part of the test made it impracticable to operate the furnace as rapidly as appeared possible. This fact should be taken into account in interpretation of the results of the test.

The results reported to the bureau for the nine-day test period are summarized in Table 5. Similar data for August and September are given in Table 6 as a basis for comparison with the results of the coke from Orient coal with the regular coke used at this plant. In considering these data as to pig iron output, it is interesting to note that the average daily output for several months during 1918, when using the regular coke supply, was no greater than the minimum day encountered during the period of use of the test coal. The minimum during the test period was 169 gross tons of pig, the maximum 250 gross tons, the average 198.

Conclusions Drawn from the Test

The conclusions reached by A. S. Knowles, the representative of the Bureau of Mines, as to the general performance of the furnace during the test period were in part as follows:

It may be noted that during the test practically all of the troubles which may be expected in ordinary furnace opera-

tion were encountered and very readily and quickly overcome. This is shown in Tables 5 and 6.

In spite of all these conditions within the limited space of 9 days, the results show decidedly better practice than on regular coke and normal operation.

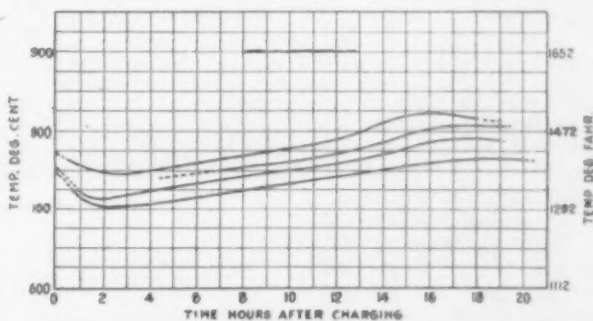
The principal feature of the Illinois coke is its rapid combustibility. This gives an intense heat right at the tuyeres and rapid, regular driving of the furnace. It must be borne in mind, of course, that the furnace lines aid most materially in this. The steep bosh is an ideal combination for small, fast burning coke. The furnace is, of course, rather small, and there is room for argument as to whether the results would be as good on the larger furnaces. However, the results for a short test are sufficiently encouraging to warrant the assumption that the coke would work very nicely in large furnaces, especially those having a steep bosh of 80 deg. or over.

The conclusions reached by the blast-furnace operators are summarized in the following letter from Henry Carson, superintendent of the furnace, to the Bureau of Standards. The two blowers on duty at the furnace during the operating test have in writing expressed their agreement with these statements.

On Oct. 19, at 1 p. m., we discontinued the use of Elkhorn-Laclede coke entirely and put on in its place the St. Paul coke. On the midnight cast of Oct. 19 a change was noticed in the volume of gas—it being increased—and the furnace began to take an increased number of charges. The rapid working of the furnace dislodged large amounts of accretions, and she began to scour on Oct. 21, dropping these accretions into the crucible, continuing so to do until about 9 p. m., Oct. 22. The results were to cool the iron, lower the silicon and raise the sulphur. As the furnace had not scoured for two months, this action was about due. My impression is that it was probably hastened by the more rapid traveling of the furnace due to the faster working of the St. Paul coke. Our heats had continued to rise in the hot blast stoves, due to the better gas, and notwithstanding the heavy scouring before mentioned, the cast following the off-cast was down in sulphur, which was a recovery quicker than we have ever been able to make on the Elkhorn-Laclede coke.

On the morning of Oct. 24, we developed a bad iron notch, which necessitated taking the wind off the furnace entirely and letting it stand while repairs were being made. In the meanwhile we had put on a burden of ore greater than we have heretofore carried.

On Oct. 25 we were compelled, at 2 p. m., to take the wind off again on account of a charge-buggy getting caught



Temperature of Vapor Above the Coal. Temperature determinations were made in the gas space immediately above the coal mass.

in the bell and hopper. Our temperature in the stoves, however, continued very high.

Again, on Oct. 27, in the morning, we had to stop operation in order to pack the hopper in the top of the furnace, which had been worked loose on account of the trouble we had had with the accident caused by the buggy getting between the bell and hopper.

In the meanwhile, the larger size St. Paul coke being used up, we started on the stove size. It was so small our burden packed, and we had to put on 3 lb. additional pressure of wind in order to get the wind through it. No appreciable change was noted between the larger size and the smaller size, except the additional wind pressure before mentioned and the slowing down of the number of charges.

This St. Paul coke seems to be a little harder than the Elkhorn-Laclede coke, and carried the burden quite as well. The most notable difference between the two cokes, I should say, is that the St. Paul coke works faster, gives a greater tonnage per day, yields a better gas for stoves and boilers, thereby giving a hotter blast temperature. It was noticeable

that on 8 lb. of wind on St. Paul coke we got as good results as with 10 lb. of wind on Elkhorn-Laclede coke. I see no other difference in the coke, and had it been of full furnace, we would have been able to charge about 60 charges per turn, or 120 per day, as compared with 85 charges, our average on Elkhorn-Laclede coke.

Edward F. Goltra, president Mississippi Valley Iron Co., has submitted to the bureau some comments on the furnace operation during this test in part as follows:

It was patent that had the coal been coked in a narrower oven, giving full size furnace coke, the furnace would have

Table 3.—Gas and By-Product Yield—Summary
Per Ton of Coal

Product	As Charged	Dry
Gas, cu. ft.:		
Surplus	5,490	5,970
To ovens	5,230	5,690
Total	10,720	11,660
Tar, gal.:		
As produced	7.81	8.49
Dry (computed)	7.57	8.23
Ammonium sulphate, pure, lb.	27.88	30.33
Ammonia, lb.	7.19	7.82
Light oil, gal.:		
As produced	3.71	4.03
Under 200 deg. C.	3.11	3.38
Benzine	2.105	2.289
Toluene	0.497	0.540
Solvent naphtha	0.130	0.141

taken 60 charges a turn, or 120 charges a day, as it demonstrated itself to be a very much faster working fuel.

The peepholes at the tuyeres disclosed that the coke held its size in its descent through the furnace, the combustion taking place fiercely at the tuyere line, giving a hot bottom and a cold top.

Charles W. Markell, chief chemist of the company, has submitted the following observations as to the performance of the Orient coke:

We found that we could get more iron by using less wind pressure than with the coke furnished us by Laclede ovens. The gas was better and produced better stove temperatures. The coke was slightly smaller in size, but harder, and seemed to come down to the tuyeres larger than the Laclede coke. The test was made under bad atmospheric conditions, and at a time when we were compelled to use a great quantity of Pilot Knob ore in order to get enough silica in burden. We had been using Workhouse stone regularly, but owing to the greater ash content of the Orient coke we obtained a lot of McLoon stone to make conditions about the same in regard to coke and limestone combined. In other words, it took practically the same amount of McLoon stone to flux ash from Orient coke as it took Workhouse stone to flux ash from Laclede coke.

The heating quality of the coke was very clearly shown on Sunday, Oct. 27, when furnace at 9:30 a. m. cast showed

Table 4.—Furnace Coke Analyses and Heating Value.

	As Loaded, per cent	Dry, per cent
Moisture	7.15	
Volatile matter	2.18	2.35
Fixed carbon	77.93	83.93
Ash	12.74	13.72
Sulphur	0.85	0.92
Carbon	77.81	83.80
Hydrogen	1.17	0.41
Oxygen	6.55	0.20
Nitrogen	0.88	0.95
Phosphorus	0.009	0.010
Heating value:		
Calories, per kg.	6,385	6,877
British thermal units, per lb.	11,493	12,379

iron analyzing Si. 0.63, S. 0.108. After a cast of high sulphur iron it usually took twelve hours or more to come around, but the next cast at 12:55 p. m. showed Si. 0.74 and S. 0.053. This quick recovery demonstrates that the coke undoubtedly has superior heating qualities, compared with the Laclede coke.

The following are among the conclusions reached by F. W. Sperr, Jr., chief chemist Koppers Co.:

With Illinois coke of normal size, and with the usual wind pressure, the rate of driving is much faster than usual. With the smaller sized coke and with the same wind

pressure, the rate of driving is still somewhat faster than usual.

With the Illinois coke of normal size, the wind pressure must be considerably reduced to bring the furnace to its normal rate of driving.

The normal sized Illinois coke is about 12 per cent lighter than the regular coke—and this must be taken into account in comparing the charges.

The coke carries a normal basic burden well with every indication that it would make any grade of foundry iron with the normal burden.

Great caution should be used in applying the results of this test, in predicting what the Illinois coke might do if used on an older blast furnace of larger capacity, or with radically different lines. All that can be said is that the results are extremely encouraging for further tests on larger furnaces with similar lines. The height of the St. Louis blast furnace is only about 13 ft. less than that of a modern 500-ton furnace, so that the actual difference is less than the relative capacity might indicate. It is impossible, however, to make any definite predictions as to the actual coke consumption and rate of production of pig iron on furnaces of different types, without actual tests—and such tests would be of the greatest practical importance.

It is important to bear in mind that the coal from which the coke used in this test was made, represented the highest grade of Illinois coking coal, and the results should not be too broadly applied to Illinois coke in general. There are, of

Table 5.—Results Reported to Bureau of Standards for Blast Furnace Test of Coke

Interval	First Period of Test	Second Period of Test	Total
Oct. 20-25	Oct. 25-29	Oct. 20-29	
Size of coke	*Large	†Small	
Coke charged, tons	902	742	1644
Pig iron produced, tons....	1012	772	1784
Pig iron produced per day, tons	202	193	198
Iron yield, actual percent- age	58.1	52.9	55.8
Coke per ton of pig iron, lb.	1774	1921	1843

*Direct from coke screens. †From stock pile.

course, great differences in Illinois coals from different districts, with respect to ash, sulphur, phosphorus, and coking quality. Such conditions have, however, been considered to apply to the broader questions of the economics of coking Illinois coal, which is being dealt with in another report.

General Conclusion

As a result of the test it is clearly demonstrated that some of the Illinois coals can be coked in the "chamber-type" oven without radical change in operating methods for the production of coke which can be successfully used in a blast furnace. However, it appears that the temperature at which Illinois coal should be handled for the production of the best coke is somewhat lower than the best operating temperatures for Eastern coals, and moreover the speed of coking of the Illinois coal is somewhat less.

The yield of gas and by-products from Illinois coal of the kind tested is excellent, both in quantity and quality. Of course the coal tested in this case represents one of the best Illinois coals for coking purposes, being lower in ash and sulphur and otherwise superior to many from this field.

In general, the comparison of Eastern coking coals with those from the mid-continent field must be made upon an economic basis since which source will be preferable depends altogether on local conditions which will affect the cost of the

Table 6.—Blast Furnace Operating Results with Regular Coke

	August	September
Pig iron produced per day, tons....	174	182
Coke per ton of pig iron, lb.	2364	2042
Iron yield, actual percentage.....	55.4	55.0

material and the relative expense of handling. These phases of the question have, however, not been discussed in this report.

Fusion Welding Applied to Drop Forgings*

Oxy-Acetylene and Electric Welds and Their Applicability to Defective Forgings—Effect of High Temperatures on Physical Structure

—BY S. W. MILLER—

IN connection with the application of fusion welding processes to drop forgings a number of questions have to be considered before a decision can be made as to their use. The principal ones are as follows: First, can any fusion process be applied; second, if so, what process should be selected; third, will a forging reclaimed by welding be satisfactory to the customer; fourth, will a welded forging give as good results as one not requiring welding; fifth, will the cost of welding be greater than that of a new forging? It would appear clear that the answers to some of these ques-

only about half that of the oxy-acetylene), yet there is greater liability with the electric process of not getting thorough fusion at the beginning of the work. In other words, as the arc is drawn between a rather heavy mass and the electrode, the former requiring some time to be brought to the fusion point, the beginning of the weld is liable to be imperfect, while with the oxy-acetylene method the piece can be brought to the melting point before any metal is added, thus insuring thorough fusion. These points then should be considered in deciding which process should be used.

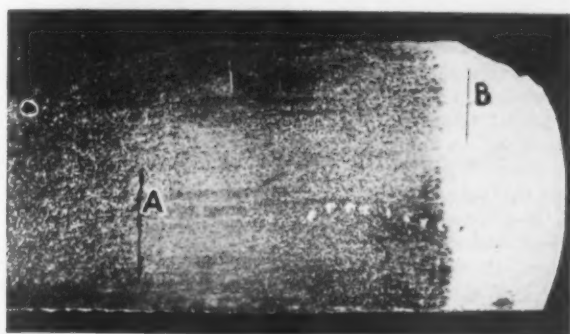


FIG. 1

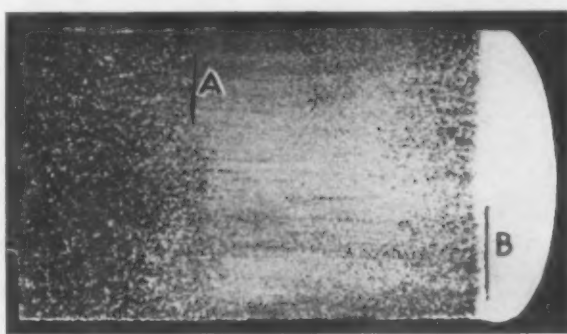


FIG. 2

tions are not within my province, as I cannot decide, for instance, whether a welded piece, no matter how good the job was, would satisfy the customer, nor can I decide as to the relative costs of welding pieces and new forgings. What I propose to do, therefore, is to merely present my ideas as to the possibilities of producing certain results by welding. I am not concerned with the third and fifth questions.

There are two methods of fusion welding which are applicable to the repair of drop forgings. Each one has its peculiarities, limitations, and advantages. They are the oxy-acetylene and the metallic electrode arc (electric). The melting temperature is maintained in the former case by the combustion of acetylene in the presence of oxygen, which gives the highest flame temperature known, about 5000 deg. Fahr. In the second method, the melting temperature is obtained by using the electric arc drawn between a metal electrode and the piece to be welded. The temperature of the arc so formed is higher than that of the oxy-acetylene flame.

I believe it will be generally found that the oxy-acetylene process is more applicable to the reclaiming of drop forgings than the electric, especially where the defects are small; because, while the electric process is considerably cheaper (the cost of operation being

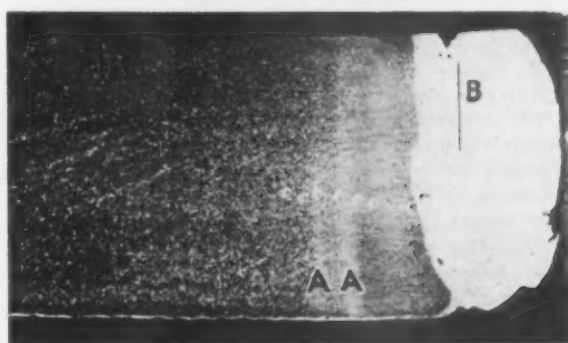


FIG. 3

Fig. 1. Oxy-Acetylene Weld in 0.50 per cent Shell Steel with 0.15 per cent Carbon Wire, magnification, 3 dia.
Fig. 2. Oxy-Acetylene Weld in 0.50 per cent Carbon Steel with 0.60 per cent Carbon Wire, 3 dia.
Fig. 3. Electric Weld in 0.50 per cent Carbon Shell Steel with 0.15 per cent Carbon Wire. The scratches at B show the location of the original surfaces, below which the metal is decarbonized. The loss of carbon is greatest in the electric weld and least in the Oxy-Acetylene weld made with a 0.60 per cent carbon wire. The A₂ points are shown at A by changes in color upon etching, 3 1/2 dia.

There remains for discussion, therefore, only the fourth question, which refers to the quality of the weld itself and the effect of welding on forging. The more important of these is the quality of the weld.

To begin with, it should be understood that the writer is not advocating, and has never advocated, the indiscriminate use of welding processes. His belief is that for many purposes a welded piece is just as good as one that does not need welding, but he also believes that there are many cases where a welded piece will not give satisfactory results, and in those cases he advocates very strongly that the

pieces be scrapped. The reason for this lies in the nature of welds. A fusion weld is a casting, and no matter by what process it is made, and no matter how good it is, and no matter to what heat treatment it is subjected, it cannot have all the qualities of a forging, so that where a heat-treated casting will not give good and safe results, a welding process should not be used.

Characteristics of the Two Methods

In order to make clear the effects of welding, it should be considered that the heat of the welding flame or arc is very high and that there is a strong tendency to burn out, both from the welded piece and the weld itself, such elements as carbon, manganese and silicon, so that the weld is usually of very different composition chemically from both the original material and the welding rod. A material commonly used for oxy-

*A paper presented before the sixth annual convention of the American Drop Forge Association, Pittsburgh, June 14. The author is connected with the Rochester Welding Works Rochester, N. Y.



FIG. 4

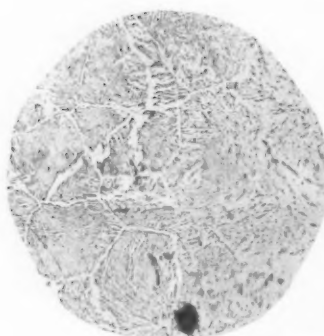


FIG. 5



FIG. 6

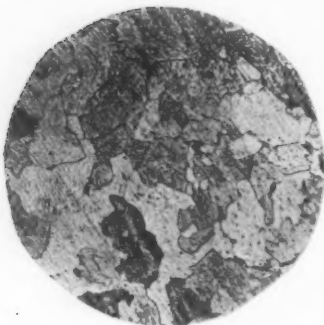


FIG. 7

Fig. 4. Electric weld. View on line of weld. Weld at right. Original material coarsened by heat. 50 dia.

Fig. 5. Oxy-acetylene weld in same material as Fig. 3. Weld at right. Original material coarsened more than with electric welding. 50 dia.

Fig. 6. Oxy-acetylene weld as made. Grain very coarse. 200 dia.

Fig. 7. Oxy-acetylene weld in Fig. 6 heated to 1800 deg. Fahr. for 10 min. Weld material refined. Temperature slightly high for best results. 200 dia.

acetylene welding is steel wire containing about 0.10 per cent carbon, 0.15 per cent manganese, and phosphorus and sulphur less than 0.04 per cent. These may be considered the usual maximum figures, although there is considerable variation in different welding wires. For special purposes, other wires may be used and some of these will be considered later. With the above wire, the carbon will be reduced in the weld to about 0.05 per cent, the manganese to about the same amount, while the sulphur and phosphorus will remain about as they were, so that such a weld is a quite pure iron casting. If properly made, the weld material will have an ultimate strength of about 52,000 lb., a yield point of about 25,000 lb., and an elongation of about 20 per cent.

The chemical composition of wires used for metallic electrode work, (electric welding), varies widely. One of the best contains about 0.15 per cent carbon, about 0.50 per cent manganese, and sulphur and phosphorus not over 0.04 per cent each. In passing through the arc in the form of a vapor, as it does, there is naturally a great opportunity for the metal to lose its carbon and manganese and to become oxidized. Such metal in the weld will contain about 0.03 per cent carbon and about 0.2 per cent manganese, the sulphur and phosphorus being practically unchanged. Its tensile strength will be about 55,000 lb. per sq. in., the yield point nearly equal to the tensile strength, and the elongation about 3 per cent.

The effect of the heat on the material being welded is different also in the two processes. With the oxy-acetylene method, the temperature is not so high nor is it so local, the result being that the heat effect extends a greater distance from the weld. (Figs. 1 and 3), and, as the heat has to be applied longer, the coarsening of the grain near the weld is greater than with the electric method, as in Figs. 4 and 5.

The quality of the material being welded should also be considered. If it is a plain carbon steel, the higher the carbon content, the greater the injury by welding to its physical characteristics. The writer's experience leads him to believe that material up to about 0.5 per cent carbon can be satisfactorily welded, provided it is properly heat treated to remove the grain coarsening. By this he means that there is no permanent damage to the material. He does not mean necessarily that the welded piece will be satisfactory, even if the weld be sound. This is a matter that will be considered later.

Considerations Before Welding

It is, therefore, evident that three things have to be considered in deciding as to the quality of a welded piece: First, the effect on the piece itself; second, whether the weld will be sufficiently strong and otherwise suitable, and third, whether heat treatment can be applied to improve the qualities of the welded piece and the weld. The answers to these questions evidently depend on the results desired.

If heat treatment is to be applied, some consideration should be given to the effect of this heat treatment on the welded piece and the weld. In an examination of the effect of such treatment on oxy-acetylene welds made in material containing about 0.18 per cent carbon, the writer found that there was a difference of about 300 deg. Fahr. between the refining temperatures of the material and the weld, the latter being made with wire of the composition above referred to. This is accounted for by the difference in carbon content, and also by the fact that the weld is a casting, which requires a higher refining temperature than a forging of the same carbon content, in order to obtain the best results. Therefore, when welding material of this kind is used, a double heat treatment is necessary, a high temperature,



FIG. 8

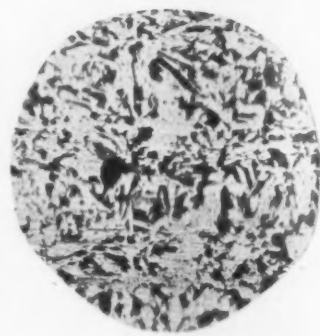


FIG. 9

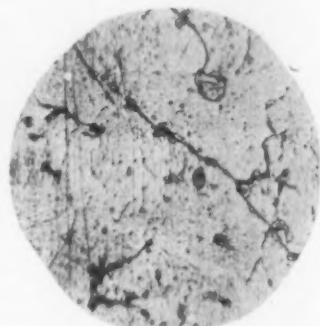


FIG. 10



FIG. 11

Fig. 8. Oxy-acetylene weld in Fig. 6. Original material as heated to 1800 deg. Fahr. for 10 min. to refine weld, and very much coarsened. 200 dia.

Fig. 9. Oxy-acetylene weld. Original in Fig. 8. Reheated to 1400 deg. Fahr. for 15 min., and refined. 200 dia.

Fig. 10. Oxy-acetylene weld made with 0.40 per cent carbon wire. Visible oxide films. These occur with other welding wires, but are not so hard to avoid. 430 dia.

Fig. 11. Oxy-acetylene weld made with 0.40 per cent steel wire. Grain boundary rupture. Nothing visible before straining except usual grain boundaries. Oxide as small round dots. 430 dia.



FIG. 12

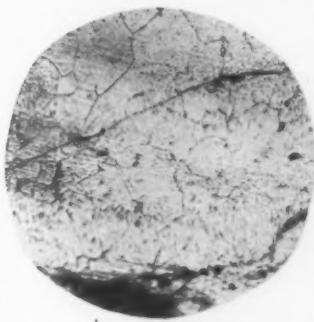


FIG. 13

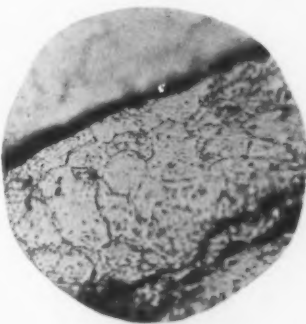


FIG. 14



FIG. 15

Fig. 12. Oxy-acetylene weld made with 0.40 per cent carbon steel wire. View in weld after straining. Primary and secondary grain boundaries. Secondary pearlite and ferrite grains rupture along primary grain boundaries. Oxide as small round dark dots. Primary grains are equi-axed but secondary grains are columnar. 430 dia.

Fig. 13. Oxy-acetylene weld. Oxide film. Carbon exists as small particles of cementite at grain boundaries. 430 dia.

Fig. 14. Same as Fig. 13, but after straining it. 430 dia.

Fig. 15. Electric weld strained. Ruptured at grain boundaries. No defects visible before rupture. 430 dia.

about 1700 deg. Fahr. for refining the weld, and a lower one, about 1450 deg. Fahr. for refining the original material, as in Figs. 6, 7, 8 and 9. It would seem advisable from this to provide a welding material, which in the weld will require the same refining temperature, and which would have the same physical characteristics as nearly as possible, as the material being welded. Whether this is possible or not is a question which has never been decided to the writer's knowledge. It would depend largely on the nature of the original material. It would appear possible to increase the carbon in the welding wire so that in the weld there will be the same carbon content as in the piece, but another difficulty is introduced, which is a practical one. Such welding material is difficult to handle and unless extreme care is used, the weld will be full of laps and oxide films, as in Figs. 10, 11, and 12, and it will be more dangerous than one made with low carbon material. Of course, careless welding with any material will make laps, etc., in the weld, as in Figs. 13 and 14. Another solution may lie in the direction of using alloy steels, such as vanadium. These make welds free from oxide, and in which the carbon is largely preserved, but they are, unless annealed, exceedingly brittle. As a matter of fact, there has never been sufficient demand for such materials to warrant any research in connection with them, but the writer feels that the time is at hand when this and similar investigations will have to be carried out.

As illustrating the effect of heat treatment, part of the weld in Fig. 29 was heated to 1550 deg. Fahr. quenched in oil, drawn at 800 deg. Fahr. and cooled in air. The structure of the weld is shown in Fig. 32, while the structure in the original material is shown in Fig. 31. The weld of course contains less carbon than the material welded, so that more ferrite is shown in the weld, but it is easily conceivable that for certain purposes such a weld would be entirely satisfactory. This is an illustration of the line of investigation that must be followed in order to determine whether welding in any particular case may be permitted. Of course, physical and chemical tests would also have to be made.

Effects of Heat Treatment

It has been found that heat treatment such as outlined above increases the ductility of sound oxy-acetylene welds made with ordinary materials. Of course, it cannot improve defective welds, such as shown in Figs. 13 and 14. More work will be required to determine the amount of improvement, and in what directions it takes place.

It is known that nickel increases the tensile strength of oxy-acetylene welds, but at the expense of ductility. Welds made with such material are also liable to contain numerous gas pockets, probably due to the nickel present.

With regard to electric welds, the writer has not yet found it possible to improve their elongation by any method of heat treatment. See Figs. 15, 16, 17 and 18. The large amount of nitride of iron present in such welds does not seem to affect their strength, (Fig. 19), because they rupture along the grain boundaries, even when there is no appearance there of any oxide or nitride films under the highest power of the microscope. The writer believes that such intergranular brittleness is due to ultra-microscopic films of oxide of iron, and is not aware of any way of eliminating these at the present time. Fig. 20 shows how electric weld material would distort if free from such films. It also does not seem to make any difference what material is used for electrodes. This problem will undoubtedly be solved, but it will take time and patient investigation.

Electric welds are also subject to defects



FIG. 16

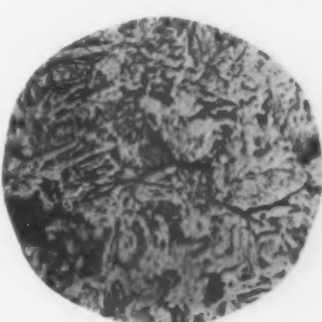


FIG. 17



FIG. 18



FIG. 19

Fig. 16. Electric weld heated to 1800 deg. Fahr. for 1 hr. and quenched in ice water. Usual structure. Spots of iron nitride in ferrite matrix. 430 dia.

Fig. 17. Same weld as Fig. 16 after straining. Ruptures along grain boundaries and at small defects. 430 dia.

Fig. 18. Electric weld normalized. Ruptures are still intergranular. 430 dia.

Fig. 19. Electric weld. Slip bands bear no relation to iron nitride plates. 1200 dia.



FIG. 20



FIG. 21



FIG. 22



FIG. 23

Fig. 20. Electric weld normalized. Heavily strained. A small spot free from intergranular ruptures. Dark spot in center is iron nitride eutectoid. It has no effect on strength, as all grains distort by slipping. 430 dia.

Fig. 21. Electric weld from globule coated with oxide film. A common defect. 430 dia.

Fig. 22. Electric weld strained. Ruptures along streak of slag. 430 dia.

Fig. 23. 0.50 per cent carbon shell steel as received. 200 dia.

such as shown in Figs. 21 and 22, but clean electrodes and careful welding help to eliminate them.

Less Successful With Alloy Steels

With regard to the welding of alloy steels, the writer has very little information. In his shop, he has not found good results in the few cases in which he has used it. It is evidently foolish to expect that a chrome nickel steel heat-treated forging can be satisfactorily welded, even with the same material as that of which the forging is made, and owing to the sensitiveness of alloy steels to heat treatment, he is at present very dubious of the results. See Figs. 23 and 24.

The question of cost enters into all this work to a very large extent. It might pay to repair drop forged automobile axles by any welding process because of the expense of the forging, while it certainly would not usually pay to repair a small lever. Also the results in the case of the axle would be entirely satisfactory, where, for example, a corner of one of the spring pads did not fill out in the die, because there is a surplus of strength at that point, and in the writer's shop similar repairs have been frequently made by both processes. Axles broken in the middle by collisions have been welded and many other repairs have been made which are considered perfectly safe and which have never given any trouble in service.

There is one thing which the writer would strongly urge, which is that those responsible for the welding make sound welds. It is rather remarkable how few welders, according to the writer's experience, are capable of doing this, and he has found that even welders who are supposed to know how to do good work, have never been trained to make reliable and uniform welds. As illustrating this, the writer knows of one test in which two welders of more than ordinary ability and experience welded five test pieces each. The average tensile strength of these ten pieces was somewhat over 46,000 lb. (not per sq. in.). An examination of the fractures showed lack of proper fusion and other imperfections which accounted for the low strength. Another welder who had been specially trained then made a test piece, with the same welding material, which broke at 56,000 lb., the weld being free from imperfection. To show what can be accomplished, the writer has a record of 15 welds made in $\frac{1}{2} \times 3\frac{1}{2}$ -in. material, the test pieces being machined all over, which gave the following results:

	T. S.	Y. P.	Elongation in center in. Per cent	Elongation in 5 in. Per cent
Maximum ..	53,300	37,100	28	26
Minimum ..	50,600	32,100	17	10.6
Average ...	51,900	33,180	23	15.6

As showing what can be done with somewhat better welding material, the following are the averages of three pieces made under the same conditions as before:

	T. S.	Y. P.	Elongation in center in. Per cent	Elongation in 5 in. Per cent
Average....	53,100	37,600	31.1	20.7

Foreign Matter Impairs Results

In making electric welds, the conditions are such that it is difficult to get them free from films of oxide, slag pockets, etc. It must be remembered that everything in the electrode goes into the weld, and if the electrode is imperfect and contains slag and dirt, the weld will also contain these same impurities. Further, the tremendous oxidation undergone by the iron as it passes through the arc is detrimental to the quality of the weld. This does not mean that this method of welding is not suitable for many purposes because it is, and is successfully used. The writer uses it every day for such purposes as filling up holes that have been drilled wrong, for

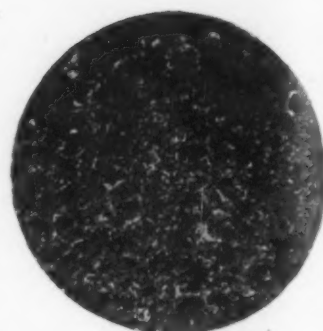


FIG. 24

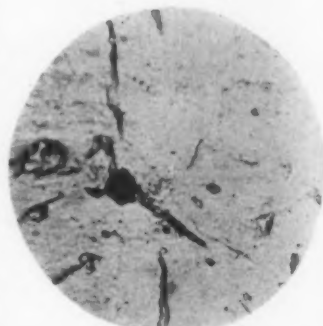


FIG. 25

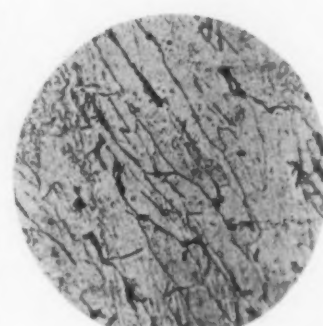


FIG. 26

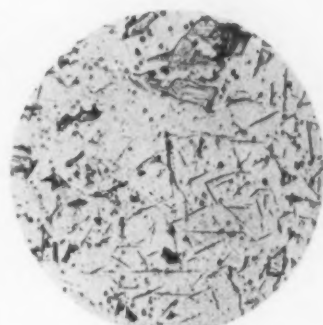


FIG. 27

Fig. 24. .050 per cent. carbon shell steel. Sorbitic structure after proper heat treatment. 200 dia.

Fig. 25. Oxy-acetylene weld. Iron nitride plates in top 1/16-in. weld; also oxide dots. 1200 dia.

Fig. 26. Electric weld showing columnar structure. 430 dia.

Fig. 27. Electric weld. Usual structure. Iron nitride eutectoid and plates and many oxide dots. 430 dia.



FIG. 28



FIG. 29

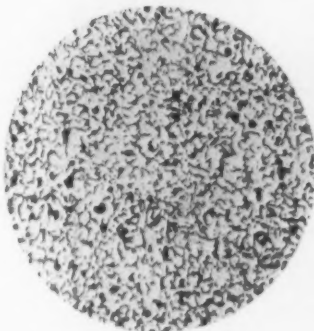


FIG. 30



FIG. 31

Fig. 28. Same as Fig. 27, but at 1200 dia. Iron-iron nitride at right.

Fig. 29. Oxy-acetylene weld in 0.40 carbon, 3½ per cent nickel steel. View on line of weld. Grain coarsened. 200 dia.

Fig. 30. Same as Fig. 29. View 5/16 in. from line of weld, showing great refinement of grain. This point is that at which A_{c_2} temperature has occurred. 200 dia.

Fig. 31. Same as Fig. 29, but heated to 1550 deg. Fahr.; quenched in oil; drawn to 800 deg. Fahr. and air cooled; view in weld. More pearlite and more ferrite than in original. Less carbon. 1200 dia.

filling up worn key seats, for replacing metal where too much has been removed in machining, and in many other places where its use is entirely satisfactory.

The advantages of the electric weld are its low cost and the speed with which it can be made. Its principal disadvantage has been referred to before, and that is its brittleness. There are many places where this is not detrimental, and if there is enough suitable work to warrant the installation of an electric welding outfit, its use will be found economical. One matter which should be watched closely in connection with electric welding is the effect of the high temperature and its sudden application to steels containing, say, 0.4 per cent carbon. It has been found that in such steels, particularly where the piece welded is of considerable size, the quenching effect of the cold metal produces a zone of sorbitic character next the weld, which may start a detail fracture under alternating stress. The work referred to is of the nature of adding material to worn shafts in order to turn them up again to the proper size. While the welding is successful, the alteration of the structure is dangerous. This difficulty can be readily overcome by preheating the shafts to a high enough temperature to prevent the formation of the brittle zone. This temperature would depend on the size of the shaft, being less for a large shaft than for a small one. The slow cooling, due to the preheating, prevents the formation of sorbite and no trouble is experienced.

With oxy-acetylene welding, this defect does not exist, as the piece being welded must be brought to a high temperature before any welding is done, and this is sufficient to anneal the material near the weld.

Breaking Welded Pieces by Test

In making tests of welded pieces, it is essential to know the qualities of the material being welded if fair comparisons are to be made; for instance, in very soft material having a tensile strength of about 50,000 lb. per sq. in., where the weld is of the same section as the rest of the piece, the chances are that a sound weld made by either process will be strong enough to break the original material, so that the figures obtained are those of the original material and not those of the weld. On the other hand, if the original material is of 60,000 lb. tensile strength the chances are that even with the weld somewhat reinforced the break will take place in the weld. The writer feels it necessary, therefore, to measure the elongation not only in the total gage length, but in each inch between the gage marks in order to be sure of what the figures do represent. In the results given above for oxy-acetylene welds, the yield points are those of the welds, while in the tests given below for electric welds the yield points are those of the original material. As stated before, the elongation of

	T. S.	Y. P.	Elongation in center 2 in.	Broke
Electric.....	51,200	31,300	.....	Outside Weld
	51,600	31,300	.....	Outside Weld
Welds.....	51,300	33,300	7.5 per cent	Inside Weld
	50,500	32,200	7.0 per cent	Inside Weld

electric weld material itself is very low and the yield point, therefore, is very close to the ultimate strength. It will be noticed that the elongation is very small, and an examination of the test pieces will show that most of it is in the original material.

While it is not always of great importance in the repair of drop forgings to consider the character of welds with regard to their soundness, because usually welds are not made in parts which require great care in order to get the best results. It may be of interest to know that in the writer's experience the quickest and easiest way of determining a welder's ability is to have him

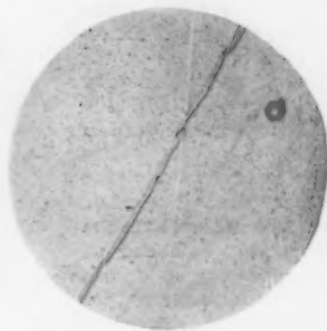


FIG. 32



FIG. 33

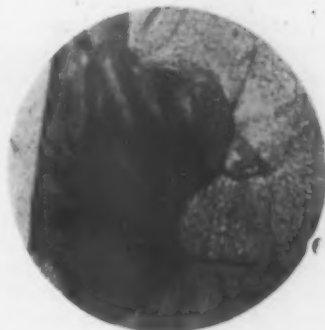


FIG. 34

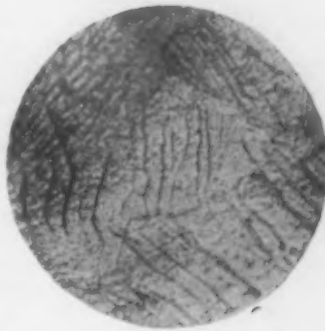


FIG. 35

Fig. 32. Iron nitride plate. 1200 dia.

Fig. 33. Eutectoid of iron and iron nitride. 1200 dia.

Fig. 34. Electric weld normalized. Etched with nitric acid and heat tinted. Martensitic structure in spot possibly due to presence of Fe_3C . 1200 dia.

Fig. 35. Armco iron. Distortion by slipping. Grain boundaries not affected. 430 dia.

weld together two pieces of $\frac{1}{2}$ x 2-in. ordinary bar steel in the case of gas welding, or two pieces of $\frac{1}{2}$ x 3-in. bar steel in the case of electric welding. The reason for using the wider piece in electric welding is that both the beginning and end of an electric weld are liable to be bad for $\frac{1}{2}$ -in. from the edge. The beginning is bad because the temperature has not been raised to the proper point, and the end is bad because the temperature is too high. With oxy-acetylene welding, the temperature at the beginning and end can be regulated by the operator. The electric weld should be machined off for $\frac{1}{2}$ in. on each side, leaving the piece about 2 in. wide. If such pieces are then clamped on an anvil or heavy block, so that the bottom of the V is on a line with the face of the anvil, and the projecting part of the piece is struck with a sledge, a very good and rapid test can be made of its quality.

It will be found that electric welds are very brittle and will not give much bending, while gas welds will bend down flat and will even stand further bending before cracking on the outside of the weld if they are properly made. An examination of the fracture will indicate the mechanical soundness of the weld. Beyond this the welder cannot go, as he has but little to do with the metallurgical character of the weld.

Welding Heat Changes Structure

The physical structures of welds are of great interest and importance. In most cases they are what would naturally be expected from the high temperatures involved in the welding operation, but in the oxy-acetylene welds made with ordinary material, the weld is coarse grained, and, on account of the distribution of the heat, the grains are approximately equi-axed, as in Fig. 6. Most of the carbon has been burned out by the heat so that what is left exists as isolated particles of cementite at the grain boundaries, as in very low carbon steel. (See Figs. 13 and 37.) There is always present more or less oxide, which is readily seen in an unetched section as small round dark dots, as in Figs. 11 and 12. There are frequently minute holes probably caused by the escape of occluded gases during cooling. Especially in the tops of welds made with a heavier tip than necessary, there are plates and needles of what is probably nitride of iron, due to the combining of the nitrogen of the air with some of the iron, as in Fig. 25. The material next to the weld is coarsened by the heat and somewhat decarbonized for some distance below the original surface. (See Figs. 1, 2 and 3.) Between the body of the weld and the original material there is a zone of gradually changing carbon content, as would be naturally expected. In this zone, unless proper fusion has occurred, there are liable to be films of oxide of great thinness, which are not visible in the polished section, but which etching shows up distinctly. These films are of the order of a $1/50000$ in. thick, and have the effect of causing the weld to break along the line of the V, greatly decreasing its tensile strength and elongation; they are also fatal under alternating stress; they are shown in Fig. 10. Similar defects are liable also to be in the body of the weld where it has been poorly made; but they do not exist in any place in a properly made weld. The burning out of carbon and the presence of oxide dots cannot be avoided, and they are the only defects which should exist in a good oxy-acetylene weld. The nitride of iron is probably of little importance, as far as ultimate strength is concerned, although it may have some effect on the elongation, and, as it should not exist in a good weld, its effect can usually be neglected.

Electric welds have the same general characteristics as oxy-acetylene welds, the difference being in de-

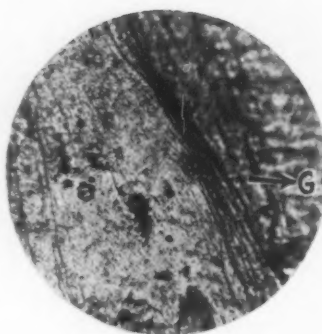


FIG. 36

Fig. 36. Oxy-acetylene weld made with low carbon wire strained. Distortion occurs by slip bands. Grain boundaries intact. 430 dia.

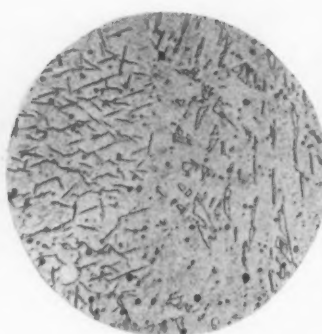


FIG. 37

Fig. 37. Electric weld made in 0.50 per cent carbon shell steel. Iron nitride spots resembling cementite. Iron nitride plates in lower part. 430 dia.

gree only. The grains are frequently columnar, their log axes being perpendicular to the surfaces of the Vs in the original material, as in Fig. 26. The layers of metal applied later refine the grain of the first layer, changing the columnar structure to an equi-axed one, so that some discretion must be used in interpreting this and other features of such welds. The reason for the columnar structure is the very rapid cooling due to the great

localness of the heat. The same result is produced in ordinary steel ingots by the cold walls of the molds. The usual structure of electric welds is shown in Figs. 27 and 28. The coarsening of the grain in the original material occurs in electric welds as well as in oxy-acetylene ones, but to less extent because of shorter time of application of the heat. (See Fig. 4.) In all fusion welds there is a zone at some distance from the weld line in which the grain is much finer than in the original material, as in Fig. 30. This zone is further away from the weld with the oxy-acetylene than with the electric process. Its distance varies with the thickness of the piece, being greater with thicker pieces, and is about $1\frac{1}{2}$ in. in the case of a gas weld made in $\frac{3}{4}$ -in. steel plate. Electric welds contain larger amounts of oxide than do oxy-acetylene welds, and they are also much more subject to defects in the form of oxide films and slag pockets for reasons already explained. (See Fig. 27.)

Nitride of Iron in Arc Welds

The special difference between electric and oxy-acetylene welds, however, is in the presence of large amounts of nitride of iron, which, as explained before, is caused by the nitrogen of the air combining with the iron at the very high temperature of the arc. Although this material has not been isolated as yet, a comparison with material that is known to be nitride of iron leaves little doubt of its identity. Nitride of iron resembles cementite very strongly with ordinary etching, as in Figs. 32 and 37, although it does not blacken with sodium picrate etching, as does cementite. Nitride of iron when present in sufficient quantities apparently forms a eutectoid with iron which very much resembles pearlite as in Fig. 33. All steels contain some nitrogen, but because there are many difficulties in the way of making analyses, not only for nitrogen, but for other gases or their compounds, and in view of the newness of the subject it is not to be wondered at that there are no accurate data as to the amounts of nitrogen in welds. Reasoning from analogy, however, it is probable that the average electric weld contains something in the neighborhood of 0.2 per cent nitrogen which, if the formula of iron nitride be Fe_3N , would give 1.8 per cent iron nitride. The appearance of an electric weld would lead one to believe that there is at least this amount of iron nitride present. The appearance of iron nitride varies from that of exceedingly thin plates of brilliant white material to masses of some size, and still further to the eutectoid referred to above. The plates are exceedingly thin, being probably at times of the order of $1/100000$ in. thick, and in many cases they appear in an etched section as dark lines of some thickness, but this is doubtless due to the acid eating off the corners of the metal next to the plates and making a groove which of course shows dark in the microscope. These plates lie along the same planes in the grains as do Neumann lines, and do not lie along the slip planes. It is doubtless for this reason that they have but little effect on the strength or distortion of an electric weld. As the amount of nitride increases, it collects in large masses which finally appear as eutectoid. In the writer's opinion, these masses of iron

nitride contain some iron carbide because parts of the spots darken with sodium picrate etching or with heat tinting, while in pure iron nitride there appears to be no such effect. (See Fig. 34.)

Reference has been made to the path of rupture in welds. As a comparison it may be stated that in sound

iron or steel this path is always through the grains along the slip planes, as in Fig. 35. In sound oxy-acetylene welds made with usual welding materials, the same path is followed, as in Fig. 36; while in electric welds the path is, within the writer's experience, always along the grain boundaries.

Unusual Effects from a New Etching Process

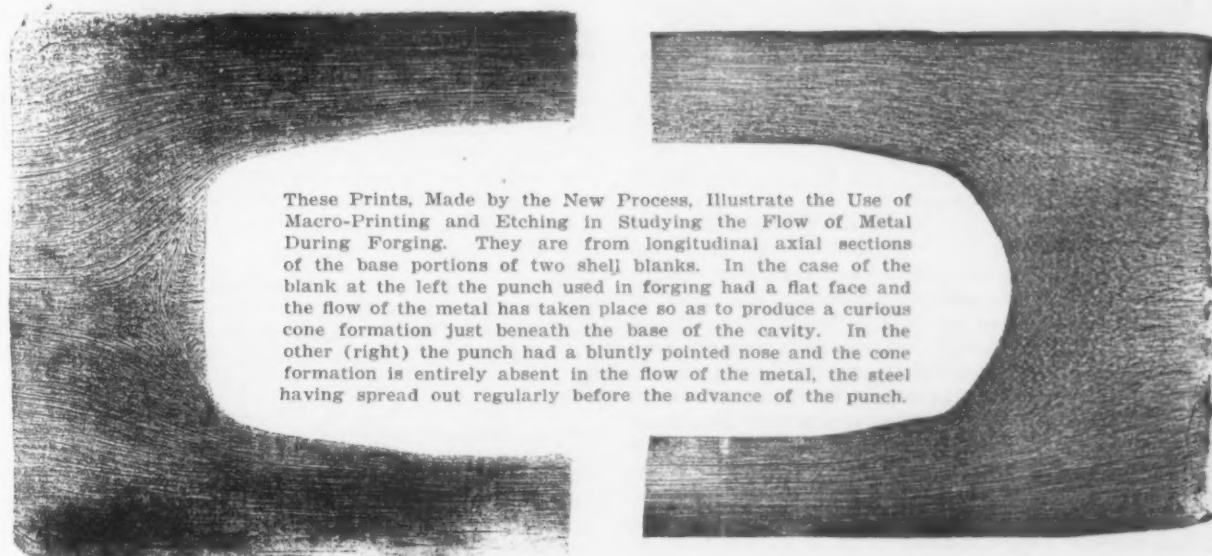
Direct Printing of Metal Surfaces with Printers' Ink Possible—Easy to Apply—Original Flow of Steel Revealed

A NEW method of etching steel, by which relief effects are produced so strong that reproductions of the details of the etched surfaces can be made by direct contact printing with printers' ink and a press, was presented at the May meeting of the Iron and Steel Institute in London in a paper, "Macro-Etching and Macro-Printing," by J. C. W. Humphrey. By its use the usual highly polished surface is unnecessary, the finish being accomplished with emery. A feature of the method is its ease of application. Specimen prints in the original paper, three of which are here reproduced, show that the lines resulting from impurities in the metal are sufficiently vivid to portray the mechanical structure of the metal almost perfectly. An abstract of the paper follows:

With the solutions usually employed for macro-etching, such as solutions of nitric acid in water or alcohol, Heyn's reagent (12 per cent solution of copper

wash off the deposit and examine the dried surface. When this is satisfactory the etching is again started with sufficient neutral reagent to form a complete but thin covering of the flocculent deposit and then, in successive applications, the acidity of the solution is gradually increased up to the maximum. The attack with the most acid solution is continued for about a quarter of an hour. When this procedure is adopted the deposit can be easily wiped away. After the surface has been freed from copper and dried, it has a general matt-gray appearance, upon which the relief does not stand out very distinctly; but if it is lightly rubbed over with fine emery-paper the relief portions are brought out into strong contrast.

The most satisfactory solution for general use is composed of 120 grams of copper-ammonium-chloride, 50 c.c. of concentrated hydrochloric acid, and 1000 c.c. of water. The most favorable percentage of acid seems to vary somewhat for different steels. If insufficient



ammonium chloride in water) strong aqueous solutions of hydrochloric acid or sulphuric acid in water, or the acid cupric reagents, the reproductions of the results can be conveniently done only by photography, and with large specimens such as complete sections of ingots, the reduction of size thus involved is liable to mask the fine details. The author, however, has found that by adding hydrochloric acid to Heyn's reagent a solution is obtained which, while having the delicacy of the acid cupric reagents, can be applied to surfaces with an emery paper finish only and which allows any full-size replicas of the etching effect to be reproduced by a simple process of printing. The addition of hydrochloric acid causes the copper deposit to form as a continuous and somewhat adherent film, rather than as the loose flocculent mass left by the neutral solution.

How the Reagent Is Used

It is preferable to support the specimen with the surface to be etched horizontal and to pour on the solution at frequent intervals. The etching is started with the neutral solution, the use of which is best continued until all traces of the scratches left by the emery-paper have been eaten away. To judge this it is necessary to

acid is present the relief effects are produced only slowly and at the expense of a deep general attack upon the surface as a whole; if the solution is too acid there appears to be a somewhat vigorous attack upon the sulphide inclusions which results in deep pitting of the surface and a general spoiling of the whole effect.

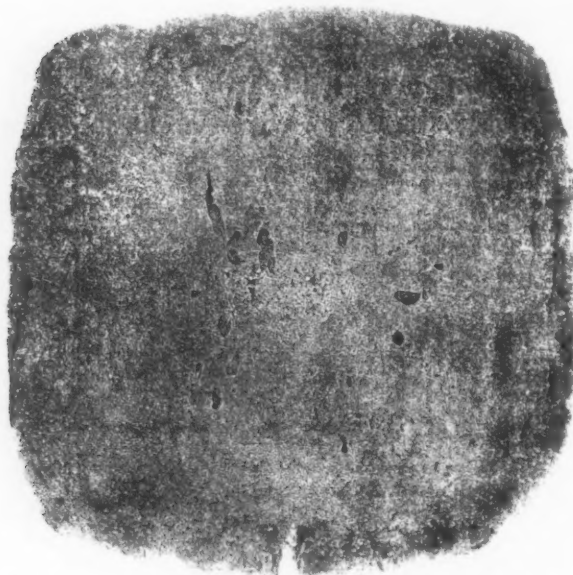
Alloy steels, such as nickel-chrome steels, appear to etch better with solutions of weaker acidity than do plain carbon steels; on them, indeed quite marked relief effects can be occasionally obtained with the neutral solution alone. File or machine marks should always be removed by rough polishing before starting to etch, as the general effect of the acid solution appears to be to deepen rather than eliminate them. If the surface has been prepared by machine grinding it should be finally polished by hand or deeply etched with the neutral reagent until all signs of surface hardening are removed.

How the Prints are Made

Prints in quantity may be made from the etched surfaces in a printing press; the illustrations of macro-etchings that accompanied the paper were all reproduced in this way, the actual specimens having been

supplied to the printers. But without expensive machinery, equally satisfactory prints can be made with apparatus readily obtainable in any laboratory or office. The etched surfaces may be printed in two ways: Either by filling the hollows with ink and wiping the reliefs clean, as in copper engraving, or by inking the reliefs with a roller and leaving the hollows free. For simplicity, speed and general convenience the latter process is much to be preferred.

When possible the specimens are machined into the form of slabs before being etched, one of the parallel faces being selected for etching. A satisfactory etch having been obtained, ordinary printers' ink is applied to the surface by means of a roller. This is preferably of the type used by printers (covered with a special



This is a Macro-Print from a Cross Section of a Segregated and Unsound Bar Having the Following Composition: Carbon, 0.45; Silicon, 0.225; Manganese, 0.76; Phosphorus, 0.021 and Sulphur, 0.021 Per Cent

composition of glue and treacle), but results almost as satisfactory have been obtained with a roller made by covering a piece of iron rod with a length of thick pressure tubing, stretching two thicknesses of black Para tubing over it and mounting the whole in an old squeegee handle. The specimen is then placed face upwards on the base of an ordinary copying press, the paper laid upon it covered with a pad and pressure applied. The best results are usually obtained upon "glossy art paper" and the best form of pad for general use consists of two thicknesses of blue livery cloth, such as is frequently used for covering polishing discs. From specimens upon which a very deep relief effect cannot be conveniently obtained, better prints can often be secured by using a somewhat harder pad—a copy of one of the weekly technical journals.

For printing specimens too large for the copying press the paper may be pressed in contact with a heavy roller. In this way perfectly satisfactory prints have been obtained from the complete longitudinal section of a one-ton ingot.

The author states that during the last three years many specimens from all types of steel used in the construction of guns and shells have been etched in his laboratory and only in those cases in which the microscope has given positive indications of incipient fusion or burning of the metal has there been any failure to reveal the casting structure or to obtain satisfactory prints by the methods described.

"Uses of Manganese Other than for Steel Making," by W. C. Phalen is the title of No. 16 of the Minerals Investigations Series of the U. S. Bureau of Mines. It forms a part of a comprehensive bulletin on manganese that is to be issued by the Bureau. It is divided into two parts: Use of manganese dioxide ore and use of manganese bronze.

The Story of Stainless Steel

The discovery of stainless steel was recently discussed in the *Organizer*, a British monthly. According to this account Harry Brearley, head of the research laboratory attached to the works of John Brown & Co., Ltd., and Thomas Firth & Sons, Ltd., Sheffield, had been actively engaged in Russia in connection with armor-piercing projectiles. To overcome erosion in rifles and guns he proposed a series of alloys, one of which came to be known later as stainless steel. The manufacture of the alloys on a large scale was not at once successful but ultimately a few tons of material, sufficiently near in composition to the specified alloy, were available for experimental purposes.

In the ordinary routine laboratory examination the non-erodible steel exhibited its characteristic properties. It was not attacked by nitric acid; it did not scale up to certain high temperatures; it did not tarnish in the laboratory atmosphere. A further memorandum prepared by Mr. Brearley enumerated the commercial purposes to which a material having these exceptional properties might be applied and among these was its proposed use for cutlery blades. He persuaded Ernest Stuart, R. F. Mosley's cutlery works, to give the material an unprejudiced trial, and these trials were ultimately successful.

No Patent in England

"The opportunity of securing an English patent for the discovery was allowed to pass," continues the *Organizer*, "but patents were obtained for America and most European countries and these are now managed by the Firth-Brearley Stainless Steel Syndicate. Meanwhile, Mr. Brearley had resigned his appointment and joined Brown Bayley's Steel Works, Ltd., as a director and works manager."

During the later war period all supplies of stainless steel were appropriated by the Ministry of Munitions of Great Britain. The bulk of the material was used for a purpose similar to that for which it was designed—exhaust valves for aero engines, which are required to be strong and resist erosion at high temperatures. Among peace-time purposes to which the material has been applied are the following:

Cutlery of all kinds, including dental and surgical instruments, palette knives, fruit-slicing blades, tobacco and leather knives, garden tools, pocket-knives, etc.

Sporting tools, such as golf-club heads, skates, rifle and gun barrels and fittings, stirrups, spurs, harness fittings, etc.

Machine parts, such as races and rollers for bearings, printing blocks, springs for chronometers and automobiles, water meters, cream separators, ice molds, weighing machines, steam traps, etc.

Engine parts subject to erosion, such as exhaust valves working at high temperatures, turbine blades.

General purposes, including pump rods, rams, cotters, evaporating pans, hot punches, marine gearing, acid pumps, etc.

The American patents have been sold to a co-operating body of large steel makers, registered as the American Stainless Steel Co. The Japanese patents have been sold to the Kawasaki Dockyard Co., Ltd.

An open competitive examination for assistant instructors, motor transport training school for men only, at salaries of from \$1500 to \$2400, to fill 100 or more vacancies at various training schools, is announced by the United States Civil-Service Commission. The examinations are divided into classes as follows: Assistant instructors for automobile machinists, automobile mechanics, ignition and carburetion, battery repair and rebuilding, for chauffeurs, welding, tire repairing and wheel building, blacksmithing and spring making, sheet-metal working and radiator repairing, carpentry and woodworking, painting, warehousing spare parts and issue. Applicants should apply for form 2118, stating the title of examination desired, to the Civil Service Commission, Washington, or the secretary of the United States Civil Service Board at the nearest Customs House. Competitors will not be required to report for examination.

PROPER ROLLING TEMPERATURE

Conditions Affecting Quality—Temperature for Finishing American Rails

The "Rolling Temperatures of Steels" was the subject of a paper by Prof. H. C. H. Carpenter, Royal School of Mines, South Kensington, England, before a recent joint session of the Birmingham Metallurgical Society and the Staffordshire Iron and Steel Institute.

Brittleness of Torpedoed Steel

The speaker said that more than a year ago he was asked by Mr. Barnaby, the distinguished naval architect, why it was that mild steel, which was a ductile material, at any rate when tested under a static test, should break up as a perfectly brittle material when a ship was torpedoed. He obtained from Mr. Barnaby some samples of the steel which had been broken in the way described.

The first sample he received had broken as a perfectly brittle material. That was to say, there was no sign of any deformation. Analysis of the steel gave carbon 0.245, silicon 0.03, sulphur 0.055, manganese 0.45, phosphorus 0.017 per cent. It was, therefore, not a very mild steel, but it was a soft steel. Micrography showed that it was a steel which had been very considerably heated. By a series of experiments in reheating samples at various temperatures he found that at 1200 deg. C. he got the very angular type of structure shown in the original ship plate; but it must be remembered that this ship plate had been worked; it was not a rolled material, and, therefore, in all probability it had been worked upon at even a higher temperature than 1200 deg. C. Therefore, he thought it was quite safe to assume that this steel had been finished at a temperature of at least 1200 deg. C. He then began to look up the literature of the subject, but found there was very little.

Five Conditions Affecting Quality

The speaker called attention to the five conditions which affect the quality of the steel. First of all, the steel must be cast within the right range of temperature; second, the ingot must be round; third, the chemical composition must be correct; fourth, the method of applying the work must be studied, and, fifth, there probably was a temperature or a temperature range at which the work should be done upon the steel when it was going to be applied to a particular purpose.

With regard to the first three points the temperature of casting had been dealt with by Mr. Longmuir, the soundness of ingots had been the subject of a great deal of research by various investigators, while the correct composition had received a great deal of attention. The method of applying work had also been very fully dealt with recently by M. Charpy. [THE IRON AGE, April 24, 1919.]

But what Dr. Carpenter said he particularly wished to bring before them was the fifth point, namely, what could one say about the temperature at which in any given case any given steel should be worked? He had been able to come across only one paper which described an investigation into rolling temperatures. Therefore, it was not surprising that in no specification of steel was there any direct reference to this matter. There was, however, an indirect reference in the American specification for rolling rails, the only known attempt to determine the temperatures for the work done on steel. With regard to general considerations, it was possible by reference to the iron-carbon equilibrium diagram to draw certain conclusions with regard to the grain size of the steel, according to the temperature at which it was finished. When steel was rolled at a temperature considerably above the transformation line, at the point where gamma passed to beta or alpha iron, the grain size would be coarse. The nearer the finishing temperature to that of the transformation line, the finer would be the steel. If it was finished below the transformation line, but above the tempera-

ture of cold working, the grains would be in the finest condition of all.

Grain Size and Resistance to Impact

The beneficial effect of small grain size on tenacity and ductility was well known, but of the resistance to impact much less was known. Such published work as was available indicated that the resistance was much greater the smaller the grain size, and that the resistance was very much higher in specimens which had been correctly heat treated.

It was desirable to test fully and in the most thorough way the influence of rolling temperatures or, more generally, temperatures at which work was done on a given material. But this must be done in the works. He would give them in some detail an account of the work that had already been done in America on this very point, because it was a research that was rendered possible by co-operation between the American Bureau of Standards and four different works. It was carried out in America by Bruggess, Crowe, Rawdon and Waltenberg, and their report was published under the title "Observations on Finishing Temperature and the Properties of Rails."

Finishing Temperatures for American Rails

These investigations showed that on an average the works in question finished the rails at a temperature 270 deg. C. above the point of the transformation line corresponding to the composition respectively of the steels. This temperature referred to the head of the rail. The center of the head, however, was some 50 deg. to 60 deg. hotter than the outside, so that this part of the rail was finished on an average at about 325 deg. C. above the critical range for 100-lb. rail sections. The report also gave data as to the ingots from which the rails were rolled, and referred to the fact that usually the argument was that rolling at below the critical range weakened the crystalline structure, while manufacturers generally preferred to roll rails at a very high temperature, as less power was then required to operate the mills.

There was, the author said, a tendency to raise rather than to lower the upper limit. The authors fully recognized that the quality of the rails depended very considerably upon the process of rolling and in particular upon the temperature at which the rails were rolled and finished, although there was no complete agreement or conclusive evidence as to the effect of finishing the rails too hot. One suggestion of the authors of the report was that the mills should make trials with a considerable number of rails, several thousand at least, similar in all other respects as far as possible, but each series rolled at a well-determined temperature, and that these rails should be examined after a number of years' use.

The reference in American rail specifications to rolling temperatures was to be found in a specification for the Pennsylvania Railroad in 1900. It was laid down that the last pass should be at a red heat, preferably a dull red. In 1901 that was replaced by a so-called shrinkage clause, which laid down that the shrinkage of the rail after sawing should not exceed a certain number of inches. It should be remembered that at that time facilities for measuring temperatures were not as satisfactory as they are to-day. A similar clause was introduced into the specification of the Engineering Association. The authors of the report, however, came to the conclusion that the shrinkage clause had no significance whatever as an attempt to limit excessive rolling temperatures by defining the maximum finishing temperatures.

Measuring Temperatures While Rolling

Having suggested a number of methods which had been or might be used for measuring the temperatures of steel while in course of working, Dr. Carpenter said that the point was that the only investigation which, as far as he knew, had been published, showed that the temperatures at which work was done upon the steel were very considerably above the critical ranges of the steel. Whether those were the right temperatures or

not one could not say, but what he did say was that it would be impossible to test whether those were suitable temperatures, otherwise than by investigation as the authors of the American report suggested on a considerable scale. He agreed with them that it would probably be worth while to roll rails in considerable numbers and at given temperatures, put them into the tracks and keep a record of their behavior.

With regard to special steels, alloy steels, of which

a large number were now rolled, it appeared to him almost certain that in view of their higher cost some data must have been accumulated in works with regard to the rolling temperatures of those particular materials. If that had not been done, he thought it was particularly necessary that it should be done in the case of those materials, because the more complicated the alloy the more difficult it would be to find the best temperature at which work should be done.

Education a Plant Efficiency Factor

Raising Individual Skill by Inculcating a General Knowledge of Processes—Application in a Tin-Plate Mill

BY J. K. LAMOREE*

THE education of employees is the most powerful single influence which can be brought to bear in the greater development of our industries. We are beginning to realize that a man must know in order to do. The employee must have knowledge of his work in order to give service. Most executives realize this, as is evidenced by the introduction of night schools, factory committees and other modern innovations. These methods are productive and wise; yet, in some cases, the most important part of the educational program is left out, namely, the study of the fundamentals of the industry itself. The higher education is neglected.

Developing Individual Emulation

The principal purpose of our industrial educational programs is the development of what has been termed non-financial incentives and is predicated upon the theory that a man will work best when he is interested. There is no fault to find with the theory; it is the methods which are in question. Most thinking men will agree that most men are honest. Most men want to give full value for the money they receive in wages—if it doesn't cost them too much in thought and labor. Most men will work harder when they are interested in what they are doing.

The problem, it is therefore demonstrated, specifically involves teaching men, first, why it is not fair to do less than their best. This implies knowledge on the part of the men of possible losses to be sustained through poor workmanship; secondly, how they can give full value with the least expenditure of effort. This implies knowledge on the part of the men of methods and reasons; and thirdly, wherein lie the interesting points of the work they are doing. This implies knowledge on the part of the men of processes beyond those in which they immediately function.

There are possibilities along this line in the steel business, especially in the finishing branches, such as the manufacture of wire, pipe, sheets, tin plate, etc., where a continuation of processes are necessary. Being more familiar with the manufacture of tin plate than any other commodity in steel, this analysis concerns more particularly that branch. The points in view, however, are not peculiar to any one line of production and can be applied to all parts of the steel industry.

Application in a Tin Plate Mill

In the manufacture of tin plate—to make the question less abstract—the steel passes through many successive stages, these being principally hot-rolling, shearing, opening, pickling, annealing, cold-rolling, and tinning. In each of these processes, as well as in transit between departments, it is possible to do one or more improper acts which will result in the plate being imperfect after tinning, or in other words, produce a "second." There are, in fact, over 50 different ways in which a second or waster sheet can be made. These ways are included in all the processes from hot-rolling to tinning. It is evident that the highest type of co-

operation between departments is necessary to produce a high percentage of prime plates. One slip, one careless operation in any one of the departments through which the sheet must pass, and it passes on to the inspector's table with the ineradicable imprint of imperfection which condemns it to the seconds or to the discard.

The present method of securing the departmental co-ordination so essential to economic operation is based upon careful management, good foremanship, and paid inspection. All of these elements are both wise and necessary; and yet one plate in every ten which reaches the inspector's table is a second or scrap. It is to save this 10 per cent, or some part of it, that some means other than those now employed must be devised.

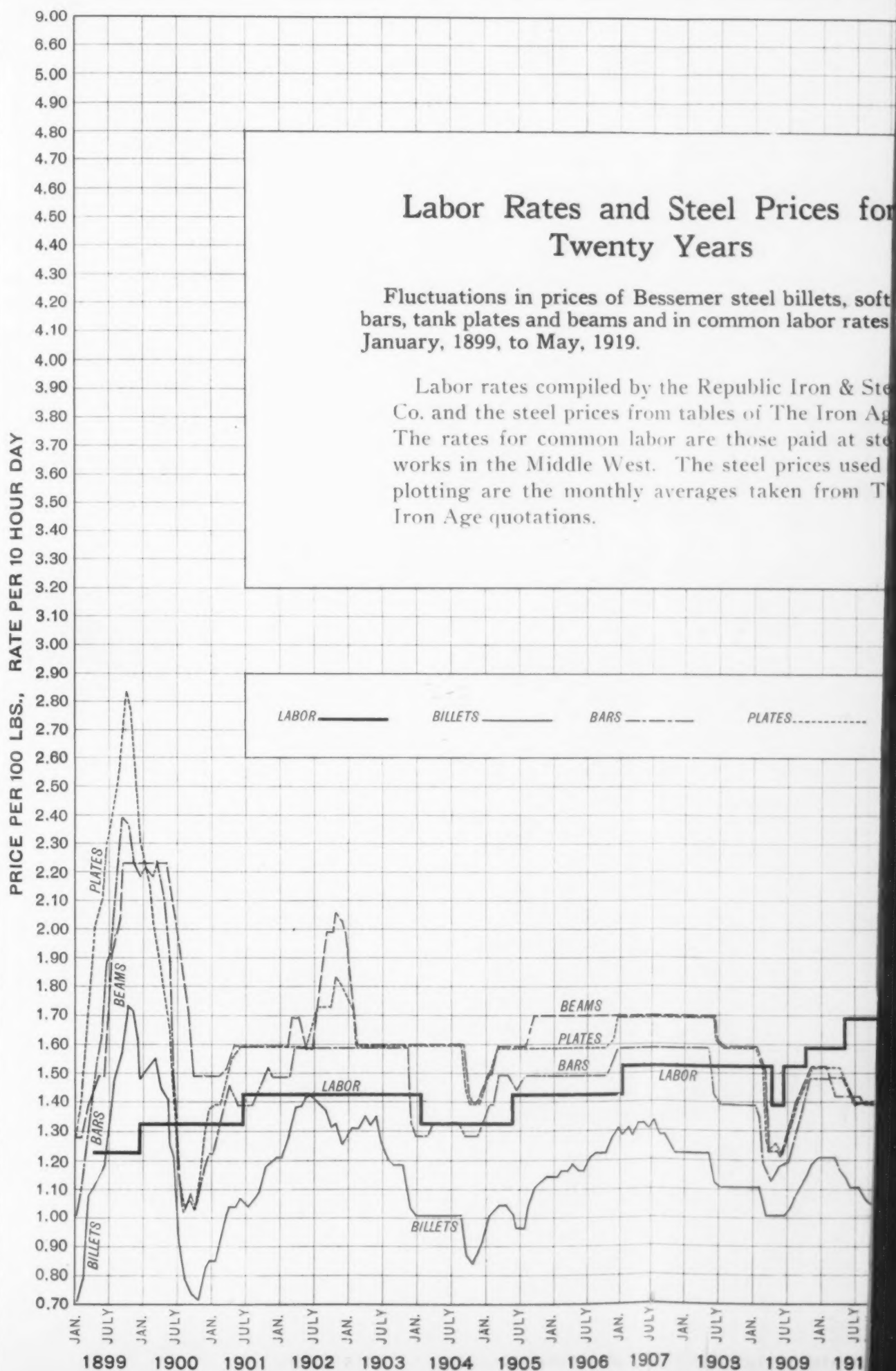
It is fair to assume that most foremen know a great deal about their own departments also, unfortunately, that they do not know nearly so much about other departments, even though the other departments are as essential in making the finished product as their own. It is probable that the ordinary workmen know a little about the inside workings of the departments in which they are employed, and very little, if anything, about other departments. As a natural result, continuity of operation is secured principally through blind obedience to orders, and not to an intelligent conception of the effect of one department's work upon that of another department, or a clear understanding of what the management is really trying to accomplish. There is manifestly room for improvement here.

It has been said that the reason American soldiers fight better and harder than German soldiers is that the American thinks for himself, uses his head and acts according to reason and judgment, while the German soldier knows only how to obey. Now, the ability to obey is not undesirable; in fact, it is absolutely necessary to the successful prosecution of any project which entails the use of men in numbers. The point is, the American's freedom of mind does not make him less amenable to discipline; it only makes him act more ably and obey more wisely. No job was ever done less efficiently because the men who were doing it knew what and why they were doing. This principle is axiomatic when applied to one man. It is for this reason true of numbers of men, when they are working with one end in view.

We applaud the soldier because he obeys, and forget that his obedience is predicated upon the fact that he knows exactly what is being done and why he is doing it. He may not know why each immediate order is issued and he may have no voice in the manner in which it is performed; but he does know the ultimate end aimed at. This is more than the average steel-mill employee knows. While victory is a tangible, living thing to the soldier, perfect product (the victory of industry) never enters into the calculations of the mill worker. We are talking now of the rank and file, not of the department heads and executives.

It is the factor of intelligent obedience to discipline which should be applied more fully to industry if we are to attain the military precision of action and uniformity of effort necessary to eliminate the waste which

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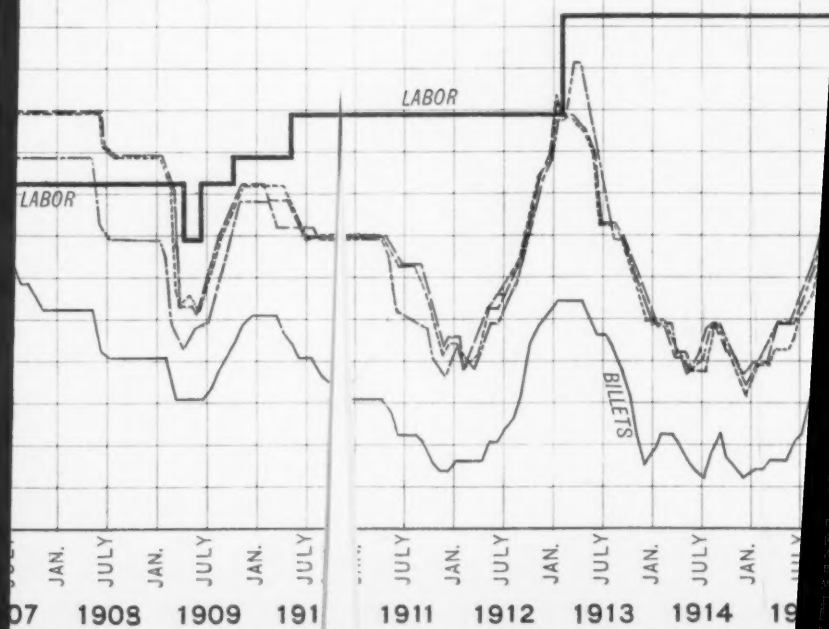
Steel Prices for Years

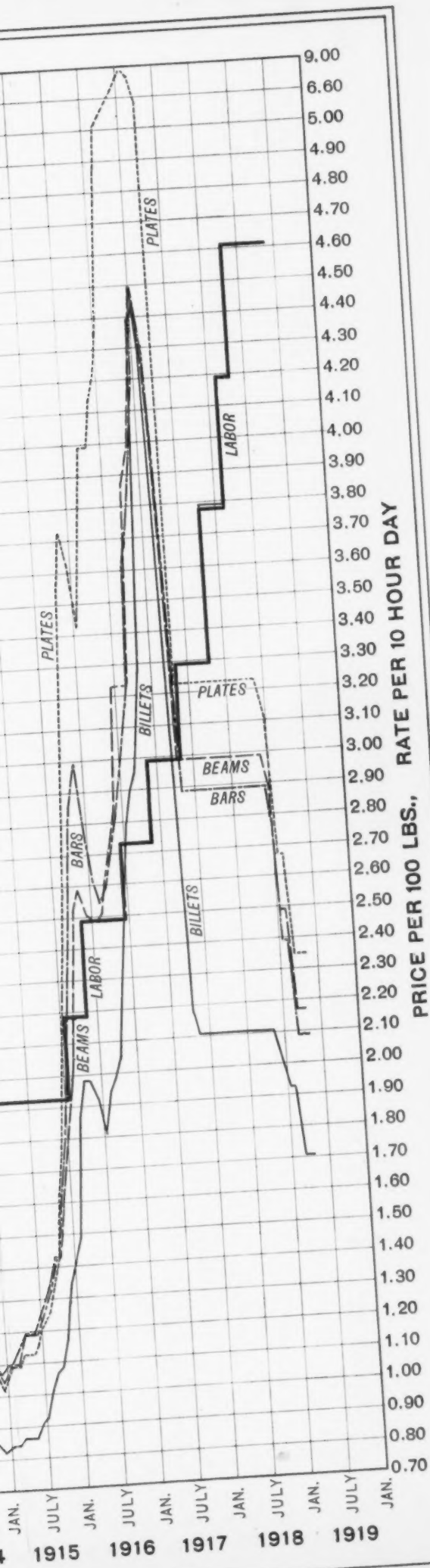
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PLATES.....

BEAMS.....





is now accepted as the inevitable part of production. How can it be secured?

Important Considerations

In the first place, men must know what they are doing. They must know more fully the effect of careless workmanship. They must be made to see the end of the process as well as the beginning. Each man must be taught to realize his own personal responsibility in connection with the condition of the finished product. He must see the actual gain or loss (not necessarily in dollars and cents, of course) caused by the kind of work he puts out. He must have a picture of the entire mill operation in order to judge his own responsible position. In a word, each man must be an executive, a mill manager, if only in the thought of the operation to follow the one the man himself is performing.

In the second place, the man must be more thoroughly taught how to secure best results in his work, these results to be judged entirely by the effect his work has upon the finished product.

In the third place, the man must be approached and taught in such a manner that the matter interests him and appeals to him. This is most essential to the accomplishment of any improvement.

One point which might bear some thought is: Just how far can the average workman be benefited in teaching him the fine points of the game? There are many legitimate trade secrets which cannot well be exposed to common knowledge, even though a doubtful advantage in production be in view. Nor would it be reasonable to advocate promiscuous discussion of processes which are perfected through expensive experimentation. At the same time, it is not to be disputed that, in some places, a false secrecy obtains which conceals nothing but that which everybody in the plant should know and which would be of no advantage except to the men themselves.

Every man can know the significance of the major processes involved in the manufacture of a tinned sheet, for example, and still not know any more than any man of average intelligence can get from a textbook. It is lack of common knowledge which is the cause of poor operation more than lack of special knowledge. It is education along lines of the fundamentals of the industry, not its refinements, that is needed.

A Primer for Plant Processes

To every man with an imagination there is nothing more interesting than the story of steel. Each phase of steel manufacture is a story in itself, and especially interesting when well told. Would it not be possible to stimulate desire, ambition and effort by telling this story to the men in the industry in the form of a monthly publication, a magazine or a pamphlet? To know the history of the steel a man is rolling, its past and probable future, surely this knowledge must breed in men a desire to do more nearly perfectly their especial part of the work.

Such a publication, a textbook of steel, could be worked out along the lines of specialized branches of the steel business, as for example, the tin-plate business, so as to embody not only knowledge of the industry but to act as a vehicle whereby men's minds may be stimulated to wholesome ideas of industrial problems.

The articles which would be printed would of necessity be written in language that the men could understand, with a free use of shop terms and a proper recognition of the mental caliber of the readers. It is not beyond reason to imagine an article addressed to rollers, or annealers, or cranemen, or enginemakers, or even to the men who sweep up the mill. Every one has his function to perform and can perform it best when he knows why and what to do. The dissemination of ideas would surely result in improvement to the men themselves. The implied confidence, the partnership of ideas would improve the spirit of co-operation, which is the real object sought.

Many other methods could be employed, such as weekly bulletins, leaflets enclosed in pay envelopes,

lectures held at the noon hour, all with the same view of teaching essential details of the work to the men.

The improvement of the human element in industry is not a new problem; yet in some cases it is possible that it has not been given its true value, measured by the cost of the finished product. This is especially liable to be the case in the steel industry where operations are on such a large scale that it might have been considered that the common workman could not possibly feel interested in the processes involved, viewed as a whole. It is possible that we have been working under more or less ideals of German blind obedience. It is certain that men cannot intelligently avoid making poor product if they do not know what constitutes poor product; which condition exists in more cases than is generally suspected.

The American laborer, especially the skilled laborer, is an educated man. He can use his brains to advantage. He can read and study. He is ambitious. Why can we not make use of his intelligence in the making of steel or tin plate or any other commodity by taking him into the partnership, by making him a fellow-executive and by putting him on his mettle by letting him know just what his work means and just what we are trying to do? It is a pleasing possibility.

Monongahela Railroad a Common Carrier

WASHINGTON, July 28—The Monongahela Connecting Railroad Co., chiefly owned by the Jones & Laughlin Steel Co. and serving its plants at Pittsburgh, has been declared a common carrier by the Interstate Commerce Commission and therefore entitled lawfully to receive from its trunk line connections divisions of joint rates or absorptions of switching charges, under appropriate tariffs, such divisions or absorptions to be reasonable.

The Commission's decision presents the history of the company, which was organized in 1885 and now operates 11.36 miles of main track and 30.23 miles of yard track and siding, or a total of 41.53 miles. This includes 1.53 miles leased from the Eastern Railroad, an affiliated company. The tracks are standard gage and laid with heavy rails.

"There are 7500 shares of capital stock outstanding," says the Commission's decision, "with a par value of \$100 each. Of these, the Jones & Laughlin Steel Co., hereinafter called the steel plant, holds 7420. The Monongahela has its separate force which averaged over 1200 employees during 1918, and the steel plant does not attempt to operate it. The present value of the property is stated as \$4,318,436.72. It is testified that this property is devoted to the public use, no intraplant service being performed. None of its tracks lies within any plant.

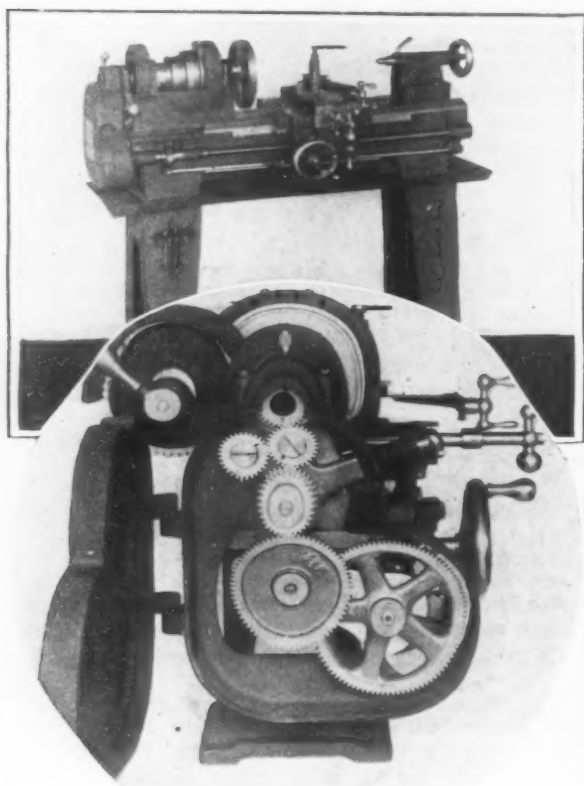
"In 1888 a number of industries in no way connected with the steel plant of the Monongahela were served by the latter. They were among the largest industries of their kind and supplied about 34 per cent of the entire traffic of the Monongahela, and a much larger proportion of the traffic on its tracks north of the river. At the present time, it serves seven industries north of the river, and one south. Of these, all but two plants of the National Tube Co. are served only by the Monongahela. Those two plants have a direct connection with the Baltimore & Ohio, but not with the Pittsburgh & Lake Erie or the Pennsylvania, the tracks of which lie south of the river. Fifty-two companies or individuals are listed as having used the team tracks in 1917.

"Defendant trunk lines," also recites the decision, "introduced no evidence except a certified copy of a letter dated May 25, 1918, from the Monongahela to the general counsel of the United States Railroad Administration, in connection with a questionnaire, explaining that it did not desire to be under federal control for the reason that the handling of war materials could be most effectively done by the existing organization."

The Government machinery in the East Springfield, Mass., plant of the Westinghouse Electric Co. has been moved out, and in a few weeks the manufacture of small motors and ignitions systems will be resumed.

A 7-In. Ball Bearing Lathe

A lathe designed to supply a demand by manufacturers and tool makers for a high-speed, screw-cutting engine lathe for work usually machined in larger and more costly tools has been placed on the market by the Flather Mfg. Co., Nashua, N. H. The capacity is about 8 in. over the ways and 15 in. between centers.



High Speed Screw-Cutting Engine Lathe for Light Cuts. Legs are cast integral for use on a bench, or pan and legs are bolted for locating on a floor

The bed is 36 in. long, braced by cross webs, and is cast integral with the legs for bench work, and is bolted to pan and legs of proper height when required for floor work. All beds are planed and scraped to receive taper attachments, which are interchangeable on any of these machines.

The spindle is bored $\frac{3}{4}$ in. clear through, and a draw-in chuck with collets up to $\frac{1}{2}$ in. can be used. The front end of the spindle is reamed to No. 3 Morse taper. The cone has three steps of large diameter for a $1\frac{1}{4}$ -in. belt, and is mounted on ball bearings held in separate housings from those carrying the spindle boxes. It is explained that these ball bearings take the strain and pull of the belt, allowing the spindle to run freely, giving maximum power and spindle speeds as high as 1500 or 2000 r.p.m. The back-gear ratio is 7 to 1. The carriage and apron are proportionally heavy, the carriage having long bearings arranged with felt wipers to lubricate and keep them clean.

A feed stop is provided which can be set for any length feeds and which automatically disengages the feed-clutch. The lead-screw is extra long and is held by a middle bearing on which the step nuts act, leaving the screw free at the back end for expansion or contraction. The lead-screw nut is cut from solid cast iron and is operated by a cam carefully milled so as to allow the nut to be closed firmly on the screw. The travel of the cross-slide is $4\frac{1}{2}$ in. and the compound-rest over $1\frac{1}{2}$ in. The cross-slide is graduated for adjusting the compound-rest so that it can be accurately read. Arrangement is made so that the cross-feed-nut does not have to be disconnected when using the taper attachment.

The countershaft is two-speed of a double friction

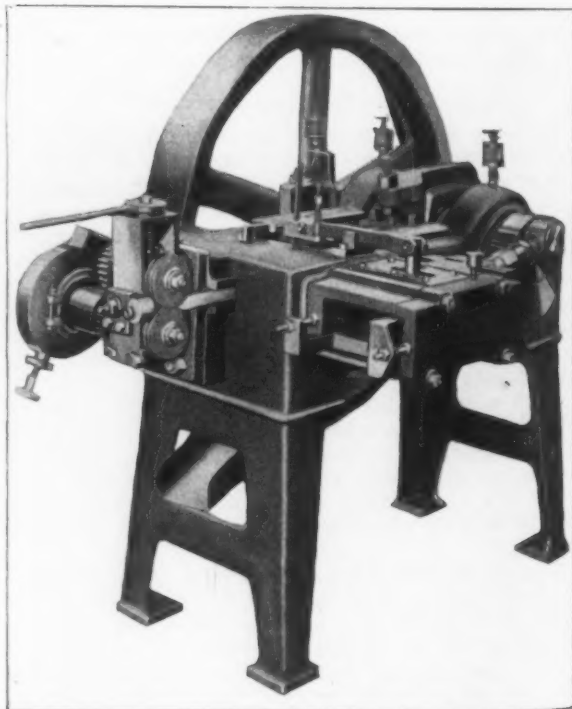
type, operated by double toggle joints, and is balanced for high speeds. A positive adjustment for the friction is provided. The net weight of the bench type lathe is about 300 lb., and with pan and legs for floor, 400 lb. The floor space required is 24 x 42 in.

Solid Die Single Stroke Header

A solid die, single-stroke header of $\frac{1}{4}$ -in. capacity has been placed on the market by the Kent Machine Co., Kent, Ohio. The bed frame is reinforced to resist torsional or distorting forces arising from heading the special non-symmetrical heads at present so much used by automobile manufacturers. The bearings for the crankshaft are located close to the crankpin, thus to avoid springing or bending action.

A scotch yoke mechanism is used for driving the cross-head forward thus to eliminate vibratory action, and at the same time give such a direct action on the cross-head as to avoid flexibility due to angularity of connection. The flywheel has a tapered square hole which fits the end of the shaft having the form of a frustrum of a pyramid. This is emphasized as an advantage when it is necessary to take down the machine and, at the same time, as giving a positive drive to the full capacity of the belt. The cut-off mechanism is adjustable for wear, and in case of repair, the removal of four nuts opens up practically the entire cut-off actuating mechanism.

A friction feed, consisting of two grooved feed rolls is actuated by a combination ratchet and ball friction device. A feed stop finger is provided to take care of any over setting of the feeding arrangement, although the accuracy of the feed is emphasized as relieving this finger from any great amount of work or pressure. The length of feed is regulated and controlled by the hand and check knobs which project from the lower part of the feed disc. The feed may be thrown off by an eighth turn of the lever located on top of the feed roll support. By removing the gibs used to hold the cross-head in place, the entire cross-head and connection with the crank may be lifted out without disturbing other parts,



A Scotch Yoke Mechanism Drives the Cross Head Forward in This Single-Stroke Header. This feature is emphasized as eliminating vibration, avoiding flexibility due to angularity of connection, and permitting of smaller size of machine.

and the cut-off and feed arrangements may be removed from the bed as units. It is pointed out that the adoption of the scotch yoke mechanism has materially reduced the size of the machine.

Quintuple Punching and Shearing Machine

A high power quintuple combination punching and shearing machine developed by Joseph T. Ryerson & Son, Chicago, is now being called to the attention of users of punching and shearing machinery. It has a steel frame and because of its universal feature is expected to fill a want in structural and car shops as well as other industrial plants, inasmuch as it will handle punching, shearing and notching work without the necessity of interchanging attachments or having to maintain a number of single machines for each operation. It is actually five metal-working machines in one unit and can handle plates, round and square bars, and do coping and notching, section cutting, etc.

The operating side of the machine is free of all overhanging machine parts such as gears, clutches, fly-wheels, etc., these being on the reverse side, an arrangement which makes for safety in operation. Care has been taken to allow sufficient space so that two or more operators will not interfere with each other, the section cutter, in particular, being given generous space so that the operator may cut material right or left handed, as he may desire. The foot lever connections for operating the clutches are arranged so they do not interfere with long plates when the latter are being split.

To insure rigidity and balance the machines have heavy ribbed bases on both sides. Heavily constructed outboard bearing brackets take up strain when the three tools are operated at once. The main frame of the machine consists of a skeleton offset body, reinforced by steel plates. The frame and plates are interlocked by steel pins. Plates may be slit up to a maximum capacity in any length and width, an adequate hold-down for material being provided.

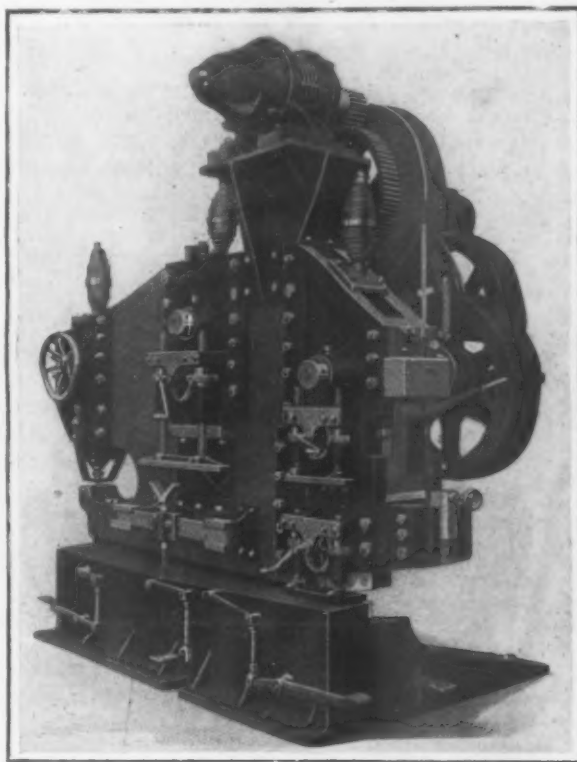
The punch is equipped with standard architectural jaws, permitting the punching of I-beams, channels and sections. The cam shaft of the punch is provided with a hand wheel, so that the punch may be centered to the full length of the stroke.

The sliding head of the plate shear provides a shear for cutting round and square bars. The coping and notching machine consists of two crucible-steel cover plates and brackets rigidly jointed to form a jaw in which lower coping and notching blades are mounted. The coping and notching blocks are fastened to the sliding head by means of a wedge, thus permitting quick changes.

The universal section cutter is provided with a patented blade holder which permits a quick change of

blades for cutting angles, channels, tees, I-beams, or other sections. The movable shear blade is loosely set into the upper holder and the stationary blade is mounted in the lower shear block, both blades being held in place by means of a saddle and two adjusting wedges.

For all operations suitable hold-downs are provided. Accessory cutter, blades and parts are supplied as de-



Quintuple Machine for Punching, Shearing and Notching

sired. The machines are made in six sizes. No. 1 will cut plates up to $\frac{1}{4}$ in.; round bars up to 1 in.; cope light channels up to 2 in.; cut angles up to $2\frac{1}{2} \times \frac{1}{4}$ in.; and punch holes up to $\frac{3}{8}$ in. No. 6 will shear plates up to $1\frac{1}{4}$ in.; cut round bars up to 3 in.; cope light I-beams and channels up to 15 in.; cut angles up to $8 \times 8 \times \frac{3}{4}$ in., and punch holes up to $1\frac{1}{2}$ in. The No. 1 machine requires from 1 to 3 hp. and the No. 6 from 25 to 30 hp.

Cheaper Denatured Alcohol Forecast

WASHINGTON, July 28.—Denatured alcohol will be produced 40 per cent more cheaply than at present as soon as the prohibition enforcement bill becomes a law. This is the estimate of experts who have studied the features of the bill relating to the production of industrial alcohol. Originally the measure was intended to put into form the prohibition amendment to the Constitution. After both Houses of Congress had held hearings on the subject, however, it was decided to add a section covering the production of industrial alcohol. One of the witnesses told the committee that industrial alcohol was almost as important to the United States as pig iron. Almost every industry uses it in some form. So far, the production of alcohol has been hampered by the fact that it had to conform to the strict requirements of the internal revenue laws concerning beverage distilleries. These distilleries were allowed to operate only six days each week and under restrictions.

During the war the necessity of alcohol for war purposes forced the complete abandonment of these regulations. The chief cause was the request of General Pershing for 1000 tons of mustard gas a day. To produce this 1000 tons of alcohol were required daily. At that time the distilleries were producing approximately 500 tons daily. By dropping the special requirements it was possible to force production to 1000 tons a day.

If this production can be kept up, and the cheaper price is expected to warrant such production, experts say that the output will cost but 60 per cent of the old price. This would prove of particular importance in the use of alcohol for heating, lighting and power purposes. As a solvent, alcohol has had no competitors and a cheaper price there should greatly cheapen general production. For fuel purposes, however, alcohol must compete with oil, especially gasoline, and a deep cut in alcohol prices is expected to have an important bearing on fuel costs.

The prohibition enforcement bill, if passed, will be almost as important in advancing the use of alcohol as the law of 1906, which first permitted tax-free sale of denatured alcohol. Before that time beverage and non-beverage alcohols were subjected to the same tax. At that time it was provided that grain alcohol combined with wood alcohol or a small percentage of benzine, should be tax free. That measure, however, did not remove the expensive restrictions upon methods of manufacture. The fact that the present bill removes these restrictions is therefore of the highest importance. It requires all producers of such alcohol to secure special permits and to give bond for the operation of their plants, and specifically repeals the long series of restrictive statutes.

In 1907, the first year after the passage of the original denatured alcohol law, only 1,782,000 gal. were produced, against 50,163,000 gal. in 1918.

WELSH TIN PLATE DELEGATES

American Visit Set for September—Workers Will Increase Output

The joint delegation of Welsh manufacturers of tin plate and employees in Welsh mills, who will visit the United States to investigate the methods of manufacture under which American exports of tin plate have so largely increased, will not reach this country until September. It was thought best to avoid the heat of the summer months.

American competition was the chief topic discussed at a recent meeting of the Joint Industrial Council of the Welsh sheet and tin plate trade, which awarded the tin plate workers a 12½ per cent advance for three months. The council has been in existence more than 20 years; in it are representatives of the unions and the Welsh Plate and Sheet Manufacturers' Association. In arguing that they found it difficult to maintain any of their export trade without unusual sacrifices, the employers pointed out at the recent meeting that the American production per mill was double that of Welsh mills, and the cost much less owing to quantity production. The workers in reply said that with the same facilities they would make the same production. It was then agreed to send a joint delegation of employers and employees to the United States to investigate conditions and improvements.

A Welsh manufacturer, describing the working of the American mills at the meeting of the council, said: "The mills are worked in 8-hr. shifts, doubly manned so that the rolls are kept full all the time. Each of the workers has a helper, so that as one finishes his part he steps aside and immediately his mate takes his place and carries on the work of rolling or furnacing, as the case may be, while the other man takes a short spell and is fit to come up to scratch a few minutes later, to relieve the helper."

The workers in the Welsh mills hope that the delegation to the United States will convince the manufacturers of the advisability of raising the floors of the mills, cooling the fronts of the furnaces, also the floors, and strengthening machinery, all of which must be done, it is contended, before Wales can compete on anything like an equal footing with American mills. Proof of the inroads of American competition on the Welsh industry is given in the figures of tin plate production before and since the war. Previous to the war the total for the two countries was 1,600,000 tons. To-day the United States is producing that amount and in 1918 exported 258,538 tons to markets formerly Welsh strongholds.

Norway's Progress in Electrical Iron Smelting

WASHINGTON, July 28.—An interview with O. H. Holta, director of the Tinfoss Iron Works at Notodden, the only plant in Norway which produces pig iron by electrical means, has been forwarded to the Department of Commerce by Trade Commissioner Nels A. Bengston at Christiania. Mr. Holta says, regarding the work of the plant:

"The Tinfoss Iron Works were first operated in January, 1910, but could hardly be considered as engaged in commercial production until 1913. In 1914 the industry was quite successful, but the outbreak of the war made it difficult to obtain the necessary raw materials, especially the electrodes. We established our own electrode factory, the first in Norway, and as a result the latter part of 1916 and the first part of 1917 proved to be very good seasons. Since then the export of our products has been practically forbidden, much to our detriment. We had nearly all our foreign demand from Denmark where we supplied 42 foundries with pig iron, but lost these customers on account of the prohibition of exports and later have been able to get back but few of them. Tinfoss iron is of a higher quality than is demanded by most of the Norwegian foundries, and consequently they use largely the cheaper though lower grade English pig iron. The electrical reduction of iron ore, undoubtedly,

has a favorable future in Norway. The present prospects are that methods will be devised which will make it possible to use our low-grade ores. The excessively high prices on coal make the use of electricity the only practical method of reducing our iron ores. It is believed, however, that the future of the industry will find its greatest success in the development of steel works in connection with the smelters. It is the intention of the Tinfoss Iron Works to erect a steel plant within a year or two whenever the prices of construction will have become stabilized."

Electric Steel in Australia

The manufacture of electric steel in Australia has expanded considerably recently, according to an article in *Industrial Australian*. The first plant erected was that of Australian Electric Steel, Ltd., at Alexandria, Sydney, comprising two furnaces of the Electro-Metals type, each having a capacity of two tons. Steel castings have been turned out in considerable variety for special purposes. Ingots have also been supplied ranging in size from 4 in. square up to 24 by 12 in., and some of these have already been used for the forging of railroad axles with successful results.

In Victoria an important step was taken last year by the railroad commissioners toward introducing electric furnaces at the Newport shops when three members of the staff of the railroad department were sent to America and Canada for the purpose of making inquiries and securing all the information necessary to enable a furnace to be installed. An ample supply of cheap electric current will soon be available for use at Newport from the department's own power house and high-grade steel castings will be made.

The Victorian Iron Rolling Co. of Melbourne, is also installing a plant for the production of high-grade steel. In this case the furnace will have a capacity of six tons. It is expected to produce about 30 tons of steel per day.

In the Newcastle district another company, the Commonwealth Steel Products Co., is about to commence operations. This firm is now erecting a complete plant for making electric steel, rolling tires and forging railroad axles, close to the Waratah railroad station. Special interest attaches to the tire mill, which is of a type used extensively both in America and in England, but is the first of its kind in Australia.

Italian Imports of Iron and Steel

Italian imports of iron, steel and other commodities were much less in 1918 than in 1917, according to *La Metallurgia Italiana*:

	1918	1917
Pig iron	115,211	315,953
Iron and steel scrap.....	17,667	226,937
Steel ingots	5,411	42,894
Forgings and castings.....	27,838	16,785
Tin plates	49,829	32,077
Steel bars	369,369	420,442
Rails	12,756	36,303
Iron ore	1,951	313
Manganese ore	5,452	21,538

In 1918 imports of zinc were 10,749 metric tons, against 19,383 tons in 1917.

East Indian Iron Deposits Confirmed

WASHINGTON, July 28.—According to advices received from the Far Eastern Division of the Bureau of Foreign and Domestic Commerce, the report some time ago of the large iron ore deposits discovered in what is known as the lake district of Celebes, Dutch East Indies, has been officially substantiated by Government investigations. It is said that the ore is similar to the Cuban ore and to that in the Philippines. The quantity of the deposits is estimated to be 5,000,000 tons of surface ore and 155,000,000 tons of clay ore, a total of 160,000,000 tons, with prospects of this amount reaching 7,000,000 tons of surface ore and 206,000,000 tons of clay ore, or a total of 213,000,000 tons. The ore can be removed cheaply, since the layers do not run more than 45 ft. below the surface of the ground. The problem of working these fields is receiving the

careful study of the Dutch engineers. Two methods appear to be open; one is the smelting of the ore by the use of coke (the coal of Ombilin and Mamatan being well adapted for coking), and the other is by electrical smelting. The latter method is preferred, as it is believed there is sufficient water power in the vicinity of the ore beds, and the establishment of electrical equipment can be done at a moderate cost. An examination of the water-power possibilities is now being made.

Transforming French Plants to a Peace Basis

Most of the French plants which existed before the war have resumed their old style of industry, according to an investigation by the French Labor Ministry. To do this they have naturally been obliged to modify their war plant, and this period of modification generally necessitates a temporary reduction in the number of hands employed. A few typical cases of transformation are cited:

Shell-turning.—Of the numerous establishments where this work was done, some are making iron shutters, picks, vises and portable forges, safes, and washing machines. One shell factory, which also made "tank" parts, is now turning out machines for stations and chocolate manufacturers.

Foundries.—Grenade and shell foundries have turned their attention to tubes, castings for agricultural machinery, non-rusting saucepans and cast-iron fire-dogs.

Aeroplane Works.—One firm has resumed the making of threshing machines. Another (which made the wings of aeroplanes) has started manufacturing furniture. An aeroplane repair shop turns out agricultural tractors. Galvanized hollowware is now being produced in two factories, of which one made oil tanks for aviators during the war, the other aeroplane parts. Soldering lamps and carburetors are coming from a shop which made small fittings for avions.

War Engines.—Sheet iron is now produced in a factory formerly devoted to torpedoes; motor head-lamps in a factory formerly devoted to bombs, and small boilers at a workshop where incendiary bombs were produced.

Many establishments are still in course of transformation.

British Tungsten and Molybdenum Industry

During the war the production of molybdenum and tungsten ores throughout the world has increased enormously, while the demand has since the date of the armistice greatly decreased, says the *London Iron and Coal Trades Review*. The stocks in this country or on the way will be more than enough to meet the requirements of the United Kingdom for at least 18 months. If the arrangements by which the British Government buys the Empire's output of these ores are continued, by the end of 1919 there will be in stock in this country enough to meet the requirements of the United Kingdom's home and export trade for no less than two years, and as these stocks will have to be realized at a price not higher than the world's price, which will presumably be much lower than that now paid by the government, there will be for two years no market in this country for Empire ores and the effect will almost certainly be that many mines within the Empire will have to close down, and the result to the future of the industry might be disastrous.

In the circumstances the only satisfactory solution for both the British Government and the producers appears to be an agreement by which the Empire output and shipments to this country will be drastically reduced for the present, thus allowing stocks to be realized and the world's market to settle down so that the industry may resume normal working as soon as possible. Consequently the Minister of Munitions has terminated the existing purchase arrangements and will not accept delivery of any tungsten ore or molybdenite loaded from British overseas ports on ocean steamers after April 30. In addition, the Minister of Munitions hopes producers in their own interests will take immediate steps to reduce the production of these ores.

REDUCE STEEL AND COAL

Plan Proposed in Congress for Getting Down the Cost of Living

WASHINGTON, July 28.—Governmental action forcing reductions first in the price of coal and second in the price of iron and steel was urged by Representative George Huddleston of Birmingham, Ala., before the House Rules Committee. The matter under consideration was the resolution introduced by Mr. Huddleston for an investigation of alleged profiteering of coal producers. In his discussion of the general problem of the high cost of living Mr. Huddleston got away from the exact subject of his resolution and frequently touched on steel and iron prices. Members of the committee sought to pin him down to the precise manner in which he would force reductions in prices, but beyond broad statements that he would fix prices on basic commodities, they failed to get much enlightenment as to the practical application of his theories in the light of the fate of the Redfield price stabilization Industrial Board and the opinion of the Attorney General as to the legality of the whole proceeding.

"The trouble today is that the industries of the United States are deadlocked against themselves on account of the extortionate prices," said Mr. Huddleston. "That is the cause for existing general business depression and idleness. It is because of the extortionate prices being demanded for raw materials. Of course, by that I mean such fundamental commodities as coal and iron, cotton, wheat, oil, steel, lumber, etc., that other things are made out of. The people who produce them have made large war profits. They have made a pocket full of money during the war and they are not willing to go back to pre-war profits. They are still holding the price up, and the result is that we are not doing business in this country."

"You must bring down the cost of the materials of living. You should bring down the cost of steel. Do you expect a man who is making nails out of steel at the present prices to sell his nails at the 1914 price? He cannot do it. No more can a workingman paying present prices for the necessities of life reduce the price of his labor. Therefore, you must strike first at the great basic commodities and in that way control prices." Asked how he would start to make reductions, Mr. Huddleston said:

"I would suggest that it should begin first with coal, and second with iron. Those are the two great commodities produced in my district; they are what my people live on yet that fact does not blind my eyes to the general public welfare."

"How would you suggest that the reduction in prices be brought about?" asked Mr. Campbell.

"By a thoroughgoing system of price-fixing which would not only include the raw materials, but all the common necessities of life," replied Mr. Huddleston. "We have got to do that or something may happen to this country that is not very pleasant."

Siberian Farmers Would Buy Here

Approximately 1,127,000 Siberian farmers, all members of the United Credit Unions of the "Synovedsyooz" with a backing of 614,500,000 rubles, are in the market for American machinery and tools, according to announcement by the American-Russian Chamber of Commerce. G. N. Berseneff, the president of the unions, has come to this country to obtain tillage and harvest devices, saw mills, grain mills, tannery machinery and equipment for blacksmith and repair shops.

Mr. Berseneff, in explaining the object of his visit, said that he represents 1350 local Siberian Credit Unions, whose membership is limited to peasants and the male heads of households and whose function is to furnish loans to farmers. The work was established prior to the war, he said, with the support of the Russian Government, and was eminently successful. Its assets to-day, he said, consist of merchandise, real estate, factories, loans to members and cash on hand. Besides assisting the peasants in developing the soil, the unions also facilitate marketing of farm products.

Automatic Lathe for Rapid Production

An automatic lathe designed by L. G. Daniels, Rockford, Ill., for the rapid production of duplicate parts in large quantities is being manufactured by the Rockford Machine Tool Co., Rockford. The machine is built throughout on 22-in. heavy duty lathe lines thus to absorb vibration and withstand severe service. The work centered or mounted on an arbor is placed between the centers, the speed clutch is thrown in and the feed worm lifted into position. Both feeds are thus started and continue until the side carriage automatically trips the feed at a predetermined position and then all tools return to their starting position. The operator would then throw out the speed friction clutch and take out the finished piece and put in another one. When the operation is the same, work is held in a chuck instead of between centers. The manufacturer states that an operator can run two or more machines.

Both the side and right angle carriage are arranged to carry multiple tools; the side carriage for turning different diameters and the right angle carriage for facing and recessing. It is possible to use four or more tools in each carriage with all of them operating at the same time. There

are no mechanical changes provided, the machine being of the one speed and feed type. Change gears can be used to vary the feed but in this case the overhead pulley would have to be changed. As the machine is set up to give the most efficient speed and feed, it is pointed out that it is unnecessary to change them unless there is a radical change in the character of the work.

Drive is to a friction pulley, then through a pair of helical gears to the spindle. The side carriage is supported on a steel bar instead of on ways, has bearing directly in the head and tailstock, and is permanently clamped to the bar. When the feeds are tripped, the carriage is automatically brought back from the work so that, as it returns, the tools will not scratch the work. A hardened steel way can be applied to give the work a taper, a convex or concave form.

The right angle carriage is mounted on a bar, which is supported in a bearing cast integral with the head and tailstock and in alignment with the spindle. A segment cam on this bar is actuated by a roller from the side carriage bar. The tailstock is of the four-bolt type and is cast in one piece. The bearing on the bed is fitted with taper gib, providing for adjustment and compensation for wear. The bars are $3\frac{1}{2}$ in. in diameter with long close fitting bearings in both head and tailstock.

Instantaneous Water Heater for Power Plants

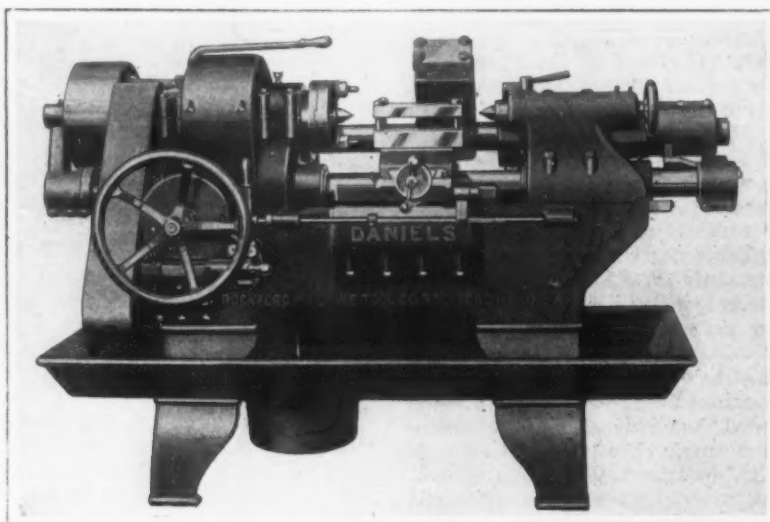
A heater embodying the distinctive features of the Goubert heater, but redesigned with a view to securing higher heat efficiency and compactness is announced by the Griscom-Russell Co., 90 West Street, New York. The heater is similar to the Goubert in regard to materials used. The shell is of cast iron, tube plates of rolled steel, and tubes of $\frac{5}{8}$ -in. outside diameter No. 16 B.W.G. seamless drawn-brass tubing expanded into a fixed tube plate at one end and into the floating head at the other end. The tubes are arranged in 2, 4, 6 or 8 passes.

New Lamp for Photomicrography

A new lamp outfit for photomicrographic work, recently described by Alexander Silverman, of the University of Pittsburgh, has a $\frac{1}{4}$ -in. tube of colorless or blue glass, partly silvered, which is bent to a circle of $1\frac{1}{2}$ in. external diameter. The single tungsten filament of the lamp can be run, for visual work, at 0.7 ampere and 9 volts for about 900 hr.; or at 0.9 ampere and 13 volts for 150 hr. for microscopic work; or at 1.02 amperes and 18 volts for $8\frac{1}{2}$ hr. The last conditions are suitable for photographic work with exposures of 15 sec. on an average. The light is reflected conically from the circular source to the portion of the object under examination. The lampholder is ring-shaped;

three iris-like fingers extend inward from the ring to clamp the holder to the objective; the lamp may also be attached to the tube of the microscope and the objective raised or lowered inside the tube; the lamp is thus maintained at a constant distance from the object and, as the lamp surrounds the objective, reflected rays only pass into the microscope tube and the eye is not strained. The illumination is said to give remarkable microscopic detail. A special rheostat is provided for the current regulation,

and the lamp may be connected with circuits of 110 volts or of 220 volts. The devices are patented.



Rapid Production of Duplicate Parts Was the Aim in Designing This Automatic Lathe. It is possible to use four or more tools in both the side and right angle carriage. The swing over the side carriage bar is 14 in.; swing over cross carriage, $10\frac{1}{2}$ in.; distance between centers, 18 in.; travel of side carriage, 12 in.

American Society of Mechanical Inspectors

The American Society of Mechanical Inspectors, 35 West Thirty-ninth Street, organized recently "to promote the science and general efficiency of mechanical inspection, along educational, technical and practical lines," now has a membership of more than 125. The 70 members who formed the nucleus were mostly in the East, but recently the membership applications have been almost entirely from the middle west.

The society has elected as patron members Arthur Knapp, Arthur Knapp Engineering Corporation; C. E. Johansson, C. E. Johansson, Inc., and A. F. Shore, Shore Instrument & Mfg. Co., Inc. Mr. Johansson will be the first lecturer of the season on Sept. 15, when the society removes its headquarters to the United Engineering Societies Building, 29 West Thirty-ninth Street, and institutes a course of weekly lectures on mechanical inspection.

A Detroit chapter of the society is being considered and it is now co-operating with the College of the City of New York in establishing an extension course of preliminary training for mechanical inspection, open to machinists and machinists' apprentices.

Speaking of the convention and exposition to be held at the Hotel Astor, New York, Feb. 2 to 6 next year, H. F. Winters, secretary, said that twelve firms have made reservations of space for booths. Among the members who are contributors of articles to the official organ, "The Inspector," and who will lecture before the society, are: E. J. Bryant, Edgar A. Morgan, H. M. Spitzenberg.

The South Halsted Street Iron Works, Chicago, changed its name to the Vanderkloot Steel Works, effective July 15. The officers and personnel of the company remain unchanged.

Gasoline Industrial Tractor

A gasoline operated tractor with a carrying capacity of 1½ tons for use in foundries, factories, etc., has been placed on the market by the Clark Tractor Co., Chicago. The machine is built low to the ground with a short turning radius and has a drawbar pull, it is stated, sufficient to move loaded freight cars without straining any of its parts, or to transport heavy trailers from one part of the plant to another at a speed ranging from ¼-mile to 15 miles per hr.

Uses pointed out for the machine include carrying shavings, foundry sand, red hot forgings or castings, finished or unfinished parts from one machine to another or between plants. It is stated that the machine will operate on rough roads as well as on factory floors

York Navy Yard; emergency hospitals, Washington, D. C.; fleet supply base, Brooklyn, N. Y.; Fort Lafayette, New York Harbor; Inspection Department, Bureau of Yards and Docks; Medical supply storehouse, New York Navy Yard; Ninety-seventh Street pier, New York City; Navy Department office building, Washington, D. C.; Portsmouth prison barracks, Kittery Point, Me.; provisions and clothing depot, No. 1, Brooklyn, N. Y.; supply storehouse, New York Navy Yard.

Chapters are devoted to labor stimulation, a brief history of the Turner Construction Co., and to the War Department Office Building, Washington, D. C.

Floor plans of many of these buildings are included with their description, also some account of the expediency with which they were erected. A perusal of the book leads to the conclusion that the Turner Construc-



This 1½-Ton Tractor Is Built with a Low Center of Gravity and Short Turning Radius. It is rated as capable of moving loaded freight cars, or of transporting heavy trailers at a speed of ¼ mile to 15 miles per hour. The application of a dump body equips the trailer for foundry use

and through snow, mud, foundry sand or on oil-sodden floors. The tractor is supplied with either platform, cargo or dump body.

Turner Construction Co.'s War Activities

In a handsomely printed book of 138 pages, 9 x 12 in. which bears the title "A Record of War Activities," the Turner Construction Co., 244 Madison Avenue, New York, illustrates and briefly describes the many large war projects it handled for the United States Government and which represents a big contribution to the war program of the nation. The volume is splendidly illustrated, some of the pictures being in colors. Opposite the preface is a portrait of Henry C. Turner. The company specializes in concrete construction.

Among the buildings and works constructed by the company were the following: United States Army supply base, Brooklyn, N. Y.; Coast Artillery barracks, New York Harbor; four buildings for the Department of Commerce, Washington, D. C.; twelve structures for the United States Navy, including: chemical laboratory, New York Navy Yard; City Park Barracks, New

York Navy Yard; emergency hospitals, Washington, D. C.; fleet supply base, Brooklyn, N. Y.; Fort Lafayette, New York Harbor; Inspection Department, Bureau of Yards and Docks; Medical supply storehouse, New York Navy Yard; Ninety-seventh Street pier, New York City; Navy Department office building, Washington, D. C.; Portsmouth prison barracks, Kittery Point, Me.; provisions and clothing depot, No. 1, Brooklyn, N. Y.; supply storehouse, New York Navy Yard.

Imports of tungsten ores into the United States in May were 285 gross tons valued at \$255,299. Of this total 151 tons came from Hong Kong, 53 tons from China, 50 from the Straits Settlements and the rest from Peru, Mexico and Chile. Exports of ferrotungsten and tungsten metal were 49 tons in May, all to Brazil.

The name of the United States Tool Co. has been changed to the Structural Tool Co. Under its new corporate name the company will continue to manufacture small tools for steel fabricators.

Self-Opening Die-heads

Self-opening screw cutting die-heads have been placed on the market by the Victor Tool Co., Inc., Waynesboro, Pa. Individual plungers having a $14\frac{1}{2}$ deg. angle support the chasers which have a corresponding angle and are held by a slot which fits into a tongue milled in the plunger. All plungers are held in a scroll ring or collar, thus to give positive and simultaneous action in opening or in closing the head. It is emphasized that this construction also permits of giving bearing to the back of the chasers their entire length.

The die-heads are automatically opened as soon as the travel of the turret is stopped and any length of thread can be cut by setting the turret slide to stop at the proper point. The head can also be opened at any point by retarding the travel of the turret slide by the handle or by disengaging pin in the latch attachment on the head. The shank can be made hollow in order to cut any length desired.

All heads are adjustable, having a variation of about $1/32$ in. either over or undersize, making it possible to cut a tight or loose thread as desired. Adjustment is by two knurled thumb screws at the back of the head, one screw being used for adjusting while the other acts as a lock screw. The head is graduated for determining the proper adjustment, and is equipped with a roughing and finishing attachment, operated by a small lever at the base of the head, which sets the dies back about 0.01 in. for the roughing cut, and then returning the handle to the opposite side sets the dies for the finished diameter to which the head has been adjusted. This is pointed out as making it possible to cut coarse threads or tough stock and get clean threads. Right or left-hand threads, standard or special pitches and any form thread can be cut. Standard heads will cut to within $\frac{1}{8}$ in. of the shoulder and where the shoulder is too large to fit into the opening of the head, chasers can be extended through the cap, permitting closer threading. Chasers are replaced by removing the cap and lifting the chasers out of the plungers and slipping others in place. The head is entirely inclosed, thus to prevent chips, dirt or any foreign matter from entering. All parts of the head are interchangeable. The die-heads are made in sizes from $\frac{3}{8}$ to 6 in.



The Screw Cutting Die Head Is Opened Automatically When the Travel of the Turret Is Stopped

A Correct Basis for Manufacturing Costs

To prevent cost factors from being charged to the wrong account, it is first necessary to establish a system in which account numbers apply to single or specific items, according to H. M. Fitz, industrial engineer with F. C. Bloomfield, 979 Woodward Avenue, Detroit. This fundamental principle is illustrated from his observations, as follows:

Employees Charging Their Own Time

In a manufacturing plant working on the day-work plan delays make no difference in the operator's check, but they do make a difference in costs and production. This lost time has been found charged to trucking, cleaning, or almost anything in a general way, except the real cause. In one plant in one month over 1000 hr. were charged by machine operators to trucking. As the average machine and man-hours time lost figured \$1.41 per hr. in this one instance, it shows a saving of \$1410 per month.

In another shop everybody seemed proud of the fact

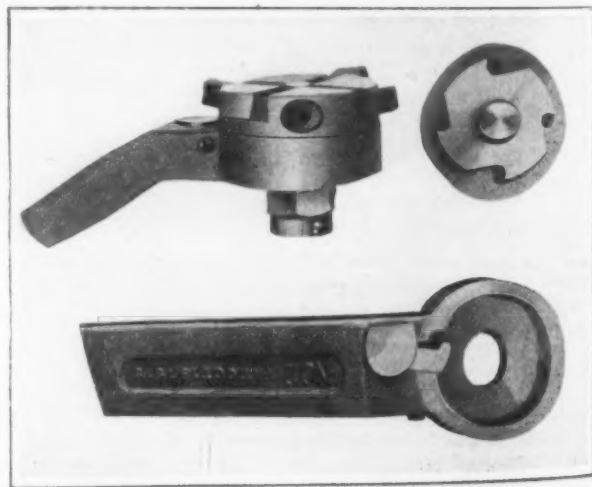
that they had a very thorough inspection system; but when the spoilage reports were produced for the month, they totaled an actual machine spoilage loss of \$39.50, figured less than 0.50 per cent. The machine scrap was charged to hard and defective castings and breaking in new employees. This account number was "worked to death," the expense averaged \$197.65 per day for a current month, of which it was later established that \$118.05 out of \$197.65 was a direct charge to carelessness on the part of machine operators. To get the foremen and men to acknowledge the responsibility and get away from the idea that spoilage is a necessity was difficult; but when there was started a reward system for quality, as well as quantity, and the company would not pay for defective workmanship, spoilage was practically eliminated, and the firm reached a good basis for costs.

Wisconsin's Compensation Law and Christian Science

Treatment by Christian Science of persons accidentally injured in industry in Wisconsin is permitted under certain restrictions by an amendment to the Wisconsin workmen's compensation law which became effective July 15. The section requiring employers to provide medical, surgical and hospital treatment is amended thus: "or at the option of the employee, if the employer has not filed notice as hereinafter provided, Christian Science treatment in lieu of medical treatment, medicines and medical supplies. . . . No compensation shall be payable for the death or disability of an employee, if his death be caused by or in so far as his disability may be aggravated, caused or continued by an unreasonable refusal or neglect to submit to or follow any competent and reasonable surgical treatment. Any employer may elect not to be subject to the provision for Christian Science treatment provided for in this sub-section by filing written notice of such election with the Industrial Commission."

Combination Lathe Tool Holder

A lathe tool holder designed to hold four bits thus to save time on work having two to four operations, has been placed on the market by the Windau Tool



Four Different Cutting Tools or Bits May Be Used on This Revolvable Holder for Use on a Lathe

Co., 1565 East Seventeenth Street, Cleveland. The bits are locked, unlocked and indexed with a wrench. It is pointed out that after being once set up, no time is required for resetting and adjusting the tool. Screw adjustments to $\frac{1}{4}$ in. provide for wear on the cutting point of the tools.

The shank is made from a drop forging and the turret from cold-rolled steel, both pack hardened in bone and oil. The shank is $1\frac{1}{4}$ by $\frac{3}{4}$ in. and admits $\frac{3}{8}$ -in. square bits. Four blank high-speed bits and a wrench are supplied with the tool.

Results of "Democracy in Industry"

Many Manufacturers Trying Employee Representation Plans, Including Works Committee, Industrial Council and House and Senate

IN THE IRON AGE of July 24 were given the results of a study by B. C. Forbes, the well-known writer on business and financial subjects, of the plans of employee representation introduced by a score of manufacturing companies in different parts of the country. Mr. Forbes's investigations had to do chiefly with the house and senate plan and his conclusions, as those who read the article will recall, were highly favorable to the plan.

Further testimony on the same subject is presented below in an article prepared for the press on behalf of the National Association of Corporation Schools, F. C. Henderschott, managing director. The association has a membership of 133 corporations, chiefly manufacturers on a large scale, maintaining their own training courses for employees. Its headquarters are at Fifteenth Street and Irving Place, New York.

To what extent the readjustment of working conditions in the industries of the United States is giving the workers a voice in management at the moment is difficult to determine. The effort to democratize the industries is making steady progress, but so far results are not conclusive.

Three Schemes of Employee Representation

The National Association of Corporation Schools is studying the problem of a more equitable distribution of created wealth, through industrial pursuits, and also attempting to eliminate present wastes, due to lockouts, strikes and other forms of industrial strife, through scientific employment, training of the industrial workers and other personnel problems. A recent inquiry by the association among several hundred industrial corporations reveals that there are three plans that are being used, all designed to give employees more voice in management, especially as relates to working conditions, hours and wages. The results of the inquiry indicate that a considerable majority of the larger industrial institutions have either inaugurated some one of the three plans or are studying the various plans and gathering data on results so far obtained, with a view to determining which of the plans they will inaugurate. The plans are known as the Works Committee plan, the Industrial Council plan and the House and Senate plan. The purposes of the three plans are practically the same, but the method of operation differs. So far as known, none of these plans involves direct representation on the part of the workers on the board of directors.

However, it is anticipated, if it is found as a result of experiments that employees assume the responsibility which logically they must assume if they are to have a continuing voice in management, that ultimately employees will be permitted to name a minority representation upon the board. Such action probably will occur only in industrial institutions where a considerable number of employees are stockholders, and the representation which they secure upon the board of directors will be dependent upon the amount of shares of stock represented by the employees who have a right to vote for such representation.

Many Demands a First Result

In one of the largest industrial institutions, where the Industrial Council plan has been made effective, the immediate result was a request on the part of the employees' representatives in the industrial council for an increase in wages and shorter working hours. This was followed by an avalanche of requests from individual employees for increases in wages. When it was pointed out to the representatives of the employees by the members of the industrial council representing the stockholders and management that such action would necessarily involve an increase in the cost of the product of the company, and that this increase would bring the selling price of the company's product to figure

considerably higher than the selling price of their competitors, the request for shorter hours and increased wages was withdrawn temporarily at least. In other words, the immediate results of giving a voice to employees through delegated representatives were wholly selfish and not based upon investigation as to conditions, and were made without any assumption of responsibility whatsoever.

In at least three large industrial institutions where some one of the three plans has been introduced, strikes have followed within a period of one month. In other companies the plans have worked well, although the period of trial is of too short duration to admit of any conclusions as to what will be the final results and as to what definite attitude the representatives of employees may ultimately take.

Will Employees Take Responsibility

The assumption may be safely made, however, that employees of industrial corporations will continue to demand a voice in those problems of management which affect wages, working conditions and hours of labor. Whether or not the representatives of the workers in industrial councils will assume a fair portion of responsibility remains to be determined. So long as shorter hours and higher wages can be secured through strikes, it is probable that the new co-operative plans will make slow progress, but when the time arrives, as it inevitably must arrive, that strikes are no longer successful, and when the public will demand to be heard in the settlement of wage disputes, it is believed that more constructive progress can be made in the working out of co-operative management, and that the workers will then assume a more definite responsibility for production.

It is obvious that responsibility must be assumed by the workers if the industries of the United States are to be placed upon a more democratic or co-operative basis. Efforts to introduce better training systems and more scientific employment methods are meeting with no opposition and are progressing steadily. Also, efforts to encourage thrift (to include home owning), group insurance and sick and death benefit features are meeting with encouragement.

More Stock Ownership Plans

The survey also disclosed that plans to insure stock ownership by employees in the company by which they are employed are rapidly becoming installed, the number of companies now introducing this feature being far in excess of the number that were working on similar plans prior to the reconstruction period. Stock ownership plans almost invariably include provision for service annuities or retirement pensions.

The belief expressed by Judge Gary, chairman of the United States Steel Corporation, that efforts to unionize the employees of the various subsidiary companies of that corporation would not succeed because the men realize they are better off under "open shop" conditions than they would be under the control of

unions is shared by many other industrial executives. In fact the present effort is not only to secure employee or co-operative effort in management, with proportionate responsibility, but also to provide conditions whereby the workers of the larger industrial institutions will receive a greater degree of advantage than

would be possible under the unions' control and direction.

The crux of the situation seems to be acceptance of responsibility by the representatives of the workers for greater output commensurate with shorter hours and higher wages.

Emigration of Aliens Exaggerated

Official Figures Collected at Washington and New York Do Not Bear Out Claims of an Unusual Exodus of Labor

WASHINGTON, July 29.—Although the Department of Labor has indulged in considerable publicity concerning the important part which the flood of emigration has played in increasing American wage rates, figures which have just been compiled by the Bureau of Immigration of the same department reveal a total excess of emigration for the eight months which have elapsed since the armistice of 15,117. The excess of alien emigration over alien arrivals is 2602, the alien arrivals in those eight months being 173,183 against 175,785 departures.

So far there has been no official comment from the Bureau of Immigration on the significance of these figures, but some of the officials have taken pains to point out how little real influence such a comparatively small deficit in the immigration figures can have on the labor situation in the United States.

For the entire fiscal year the departures exceed the arrivals by approximately 100,000,—435,160 against 333,441, but this difference is more than represented by the difference in the arrival and departure of American citizens. The arrivals of the latter totaled only 96,420 in the twelve months against 218,929 departures. The alien arrivals really exceeded the departures in that period.

The chief interest of observers centers in the figures since the signing of the armistice. These follow by months:

Month	Travel to and From the United States					
	Arrivals			Departures		
	Immigrant Aliens	Non-immigrant Aliens	U. S. Citizens	Emigrant Aliens	Aliens Non-emigrant	U. S. Citizens
Nov., 1918.	8,499	4,727	5,849	3,969	6,963	17,973
Dec.	10,748	6,672	6,081	7,038	7,952	8,833
Jan., 1919.	9,852	4,791	5,357	8,099	11,594	6,912
Feb.	10,586	5,508	6,089	11,010	6,497	5,915
March	14,105	9,370	9,626	16,019	8,662	8,682
April	18,860	14,229	10,899	17,203	8,388	8,597
May	15,093	11,677	8,949	17,800	9,303	10,883
June	17,526	12,940	5,924	25,365	9,923	5,494
Total for 8 mos.	103,269	69,914	58,774	106,503	69,282	71,289
Grand tot'l			231,957			247,074
Total for 12 mos.	141,132	95,889	96,420	123,522	92,709	218,929
(fis.yr.)						
Grand tot'l			333,441			435,160

Lack of sufficient steamship space to carry all applicants has held back considerable of the prospective emigration, but even there the Immigration Bureau authorities seem to feel that increase in sailing accommodations would have no great effect on the labor situation.

Investigation at New York

There is no unusual exodus as yet of common labor from the country, judging from statements and statistics received from the commissioner of immigration, bureau of passports and various consular offices at the port of New York.

During the first six months of 1919 the departures from the United States numbered 97,713, a little over 1000 more than during the same time the previous

year. According to the figures of the immigration authorities, there has been a steady decline in the arrivals during the past five years, and at the present time the number of immigrants is extremely small. Ships coming from European ports have been carrying their capacity of troops, and the number of passenger carrying ships has been small. The following figures from the bureau of immigration show the arrivals and departures at New York for the past twelve years:

Year	Arrivals	Departures
1907.....	1,285,349	569,882
1908.....	782,870	714,828
1909.....	751,786	284,800
1910.....	1,041,570	380,418
1911.....	1,030,300	518,215
1912.....	1,017,155	615,292
1913.....	1,427,227	611,924
1914.....	1,403,081	633,805
1915.....	434,244	384,174
1916.....	366,748	240,807
1917.....	362,877	146,379
1918.....	211,853	193,268

It is the opinion of officials in the department of immigration at Ellis Island, the immigration headquarters at New York, that owing to the difficulty and in some cases the impossibility of getting home to friends and relatives for the past five years, a great many are hurrying back to visit but will return when they see the living conditions produced by the war. On July 25 Secretary of State Lansing announced that the passport restrictions that have prevailed since the beginning of the war are raised, and passports will be issued to everyone able to show a legitimate and reasonable object. On and after Nov. 1 passports will be issued to tourists.

While the office of the new Polish consul on West Fortieth Street, New York, is crowded every day, the number of those presenting passports for visé who depart is small, according to statements of Polish authorities. Although many Poles have expressed an intention of leaving for the new Poland, and have obtained passports, the consul and Polish societies are exerting influence to keep these men in the United States. The unsettled condition of Poland and the dangers of epidemics and food shortage have proved a deterrent to many, but a change in Polish affairs may see a rather large exodus. In accordance with the plan to discourage temporarily the Polish from returning, on July 21 the Polish consul announced that immigration facilities to Poland were so bad that it would be inadvisable to attempt the trip for two or three months, and that his office would announce the proper time to go.

From Jan. 1 to July 1, six months, the Greek consul-general in New York visé passports for 8466 Greeks, and from July 1 to 25, the passports of 934 Greeks were visé.

The Italian consul-general estimates the number of passports visé for returning Italians during the first six months of this year at 35,000. At present the number of passports approved amount to about 2000 a week, a much higher average than during the first half of the year. According to the Italian consul there would probably be many times this number leaving for Italy if it were not so difficult to book passage. He considers the present exodus quite natural as travel has been almost impossible during the war. Even though

the departure of Italians alone reached the 100,000 mark this year, which it very likely will, there would be no reason for surprise, as the Italian population of the United States is put at more than 3,000,000.

No Labor Surplus in Mahoning Valley

The surplus of labor that developed in the Mahoning Valley, Ohio district, soon after the armistice was signed, has entirely disappeared, and in its place has come a shortage of labor that is being felt by the blast furnaces, steel mills, and in fact all manufacturing plants in the Mahoning Valley. A recent survey of the labor supply at industrial plants in that district showed a shortage of from 4 to 42 men in every manufacturing plant, depending upon its size. The shortage in common labor is due to the fact that hundreds of foreigners, who during the activity in the steel trade during the war were able to command very high wages, have accumulated some money and are leaving for their homes in Europe. Many are likely to remain there. Employment bureaus maintained by the leading steel companies report that a shortage in labor already exists, and this promises to become more acute in time. A decided scarcity in common labor is reported among pipe mills in the Youngstown district, and is also being felt to some extent among the blast furnaces. Some blast furnaces fear a decided shortage in supply of

common labor in the fall and winter months, and are getting ready to blow in, and accumulate iron in their yards to meet an expected demand at the time when possibly they will not be able to operate, due to shortage of labor or other causes.

The great scarcity of homes for employees of manufacturing plants all over the country is becoming more strongly apparent every day, and manufacturing concerns that for various reasons did not want to take up the project of building homes for their employees, or else finance them so that they could build their own homes, are being actually forced into doing one of these two things. Various plans are being worked out to enable workmen to build and own their homes, and one of the most popular plans is to loan money to employees at a low rate of interest, 4 or 5 per cent in some instances, and make a loan on the property up to 85 or 90 per cent of its value, the loan to be repaid in small installments each month. The Pennsylvania Rubber Co., Jeanette, Pa., some time ago bought about 120 acres of ground near its plant, upon which it is erecting modern homes of stucco and brick construction, which it is selling to its employees on liberal terms. Twelve of these houses have been finished and are occupied, and 33 more are under construction, and will be ready to be occupied as homes by its employees about November next.

THE LABOR SITUATION

New England Trend Toward 50-Hour Week—Exaggerated Strike Claims

The trend toward a 50-hr. week is very evident in New England. The newly operating 48-hr. week for women and boys under 18 years is universal in works where these classes of help predominate and is found to be an awkward number to apportion through the week unless the schedule consists of six complete 8-hr. days. With the attempt to secure a Saturday half holiday the week resolves into five 9-hr. days and the unfortunate remnant of 3 hr., which is too short to permit of efficient operation. The 50-hr. week divides well enough into five 9-hr. and one 5-hr. day. Such concerns as the Rockwood Sprinkler Co. and the Crompton & Knowles Loom Works, both of Worcester, Mass., have gone to this schedule, and appear to be typical of what is to come, according to some of the owners of plants which are still operating 54 hr. Most of the machine tool establishments still adhere to the longer schedule.

In the decision of the Massachusetts State Board of Conciliation and Arbitration in the case of the Worcester Gas Light Co. and its employees as to hours and wages is the interesting clause, which is deemed to be of enormous importance as establishing a precedent in connection with labor disputes in public utilities, that "There shall be no strike or lockout. In case any dispute arises that cannot be adjusted between the company and its employees it must be referred to the Board of Conciliation and Arbitration." The award grants a 48-hr. week, which is a reduction from 54 hr., double time for holidays, time and a half for all other overtime, and a very material advance in wages. The acceptance of the award pledges the employees not to repeat the recent strike which deprived the city of its gas supply recently.

The situation in the strike of the employees of the Graton & Knight Mfg. Co., leather belting, Worcester, which involves the shutting down of the works, continues without change. The plant is expected to resume operations soon, however, a large number of the 1500 workers who struck now desiring to return to their jobs. Suggestive of the results of a strike is the fact that the wages of these 1500 men and women total upward of \$40,000 a week.

Favorable Report from Milwaukee

A careful survey of the labor condition in Milwaukee by authorities reveals the fact that less than 0.5 per

cent of employed persons are on strike. It is stated that unrest is not more apparent at this time than in former years. Otto H. Falk, president Allis-Chalmers Mfg. Co., said in a published interview reviewing the general situation: "It is my opinion that there are fewer men out of work than usual. I would not care to say off hand how the number of strikers this year compares with those of other years, but it is certain that the general situation is good."

The St. Louis iron and steel industry is feeling the exodus of foreign labor that is setting in so strongly now. It is estimated that about 400 aliens are leaving St. Louis and the outlying district each week, and the majority of them have been employed in coal mines or steel and iron mills. Local passenger agents for steamship lines report that the increasing number of inquiries about passage indicates that many more will leave as soon as transportation is available.

Molders and core makers to the number of 225, employed in six foundries in Canton, Ohio, have struck to enforce demands for an 8-hr. day and \$6 minimum pay. They have been getting \$6 for a 9-hr. day.

The Remy electric division of the General Motors Corporation, Anderson, Ind., has reduced the working time from a 9-hr. to an 8-hr. day, with no change in wages. One shift is on from 6.45 a.m. to 2.45 p.m., and another from 3 p.m. to 11 p.m., the women stopping at 10 p.m.

To enforce a blanket demand for an increase of 10c. an hr., about 400 men employed by the Power & Mining Machinery Co., Cudahy, Wis., struck on July 22. More than half of the entire force remained at work. The company, which is a part of the Worthington Pump & Machinery Corporation, offered to increase wages to meet the level of the standard scale in effect in metal-working industries in Milwaukee, but this offer was rejected. According to a statement by John D. Bird, general manager, it is impossible to meet the demand of the strikers, which would call for an increase of 20 per cent in the payroll of the plant.

Eighty-two machinists employed by the Milwaukee Electric Crane & Mfg. Co., at West Allis, Milwaukee county, are on strike.

Metal polishers at the A. J. Lindemann-Hoverson Co., Milwaukee, manufacturer of stoves and ranges, have been on strike for several weeks.

About eight of the fourteen foundries at Worcester, Mass., are now running at reduced capacities, due to the strike of molders, which has now been operative during the past ten weeks. The other plants, the majority the largest in the city, are still closed. Among the plants now operating with independent employees are the Rice, Barton & Fales Machine & Iron Co., the

Coppus Engineering & Equipment Co., the Whitcomb-Blaisdell Machine Tool Co., the Holyoke Machine Co., and others. The plants of the Standard Foundry Co. and the L. W. Pond Machine Co. are shut down in this department entirely. The works of the Crompton & Knowles Loom Works and the Worcester Malleable Iron Co. have not been affected by the strike.

The Sessions Foundry Co., Bristol, Conn., is now running full time at its plant, giving employment to about 600 men. Effective July 7, a new wage scale was inaugurated by the company, providing for a general increase in all departments; the bulk of operations at the plant is on a piecework basis.

The Aluminum Goods Mfg. Co., Manitowoc, Wis., with branch works at Two Rivers, Wis., and Newark, N. J., distributed July 26 the final installment of a bonus on earnings of all employees during 1918 which is equal to approximately 12½ per cent. A bonus of 5 per cent was paid Jan. 10 and an equal amount on July 10. The third installment represents the accumulation of forfeitures by employees who left the service of the company after Jan. 1. The total disbursement amounts to \$150,000.

Iron molders employed in Youngstown, Ohio, district foundries have been granted a wage increase of 30 cents a day on the minimum rate. Under the new agreement, effective one year from July 1, 1919, molders will receive \$6.40 for 8 hr., the old rate being \$6.10. W. J. Wallis, president Youngstown Foundry & Machine Co., represented employers at conference with the men.

The strike of 400 machinists in Woburn, Mass., and vicinity, which had been effective for a month, was closed when a compromise was effected last week, granting them a 48-hr. week with the same pay as for a 50-hr. week plus an increase of 15 per cent, which is in reality an 18 per cent increase. The original demands called for a 44-hr. week and a 20 per cent increase in pay. The new agreement applies to the Woburn Machine Co., Woburn, the Whitney Machine Co., Winchester, and the Turner Tanning Machinery Co., Peabody. The strikers went back to work Monday.

The Standard Steel Car Co. works at Hammond, Ind., have been closed on account of a strike by carpenters and hydraulic press operators. The plant of the Haskell & Barker Car Co., Michigan City, Ind., was shut down on July 19 on account of a strike.

Judge A. B. Anderson of the United States District Court, Indianapolis, recently granted a permanent injunction to stay the International Molders' Union of North America from attempting to compel the Connorsville (Ind.) Foundry Corporation to unionize its plant, or to compel its employees to join the union.

About 135 molders and coremakers at the Bass Foundry & Machine Co., Fort Wayne, Ind., have struck as a result of the company's refusal to grant the molders' demands for a \$5.60 day of 8½ hr. until Sept. 1, and after that date an 8-hr. day with a minimum wage of \$6. Some men remained at work, and the management announced that it would keep the foundry in operation.

In celebration of his fifty-third birthday Fred A. Geier, president Cincinnati Milling Machine Co. and the Modern Foundry Co., tendered an outing to the employees of both companies and their families at the Cincinnati Zoo. The attendance was estimated at over 6000. Athletic sports were indulged in during the day and in the evening a concert was given by a band made up entirely of shop employees of the Cincinnati Milling Machine Co.

According to a patent (U. S. 1,303,993—May 20, 1919) granted to F. J. Tone, Niagara Falls, N. Y., an excellent crucible for melting metals can be made of 40 per cent graphite ground to 16 mesh; 40 per cent commercial magnesia sintered in the electric furnace and ground to 40 mesh, and 20 per cent plastic refractory clay. This forms a plastic mass which can be made into crucibles and fired in the ordinary manner and produces a superior, tough article which resists scaling or slabbing under heat variation in a superior manner.

TUNGSTEN AND MAGNESITE

Protective Duties Proposed—Canadian Reciprocity and Iron and Steel Duties

WASHINGTON, July 28.—The Ways and Means Committee of the House has approved bills for special protective tariff duties on tungsten and magnesite, but no date has been set for their consideration in the House. Provision is made for a duty on crude tungsten and tungsten concentrates of \$10 per unit of tungstic trioxide and \$1 per lb. on metallic tungsten and ferro-tungsten. Although the committee has practically decided to favor a protective tariff on magnesite the details of the bill are still to be determined. It is the hope of the committee to secure favorable action by the House on these measures during the week. Unless this can be done no action will be taken before fall, as the House has decided to take a vacation from Aug. 2 to Sept. 9.

Action on the dyestuffs and potash bills has again been delayed by a deadlock in the committee on the import license system, the minority insisting on this feature, but refusing to sanction any form of tariff protection.

The Ways and Means Committee has made a favorable report on a bill introduced by Representative Young of North Dakota, repealing the Canadian reciprocity statute. The country had almost forgotten that this measure was still on the statute books, because failure of concurrent action by the Canadian Parliament had left it ineffective. It was adopted in 1911 by the American Congress, but despite its economic advantages to Canada, local political issues resulted in the defeat of legislation on that side of the border, and the law has remained ineffective. Action by the Canadian Parliament might put it into effect at any time, however, and the Republican leaders are trying to forestall this by hurrying a repeal bill.

The Canadian reciprocity law affected a number of iron and steel products. If it had been accepted by Canada, the following would have been put on the free list in both countries: Galvanized or tinned iron and steel sheets, certain gages of galvanized wire and wire rods, all barbed fencing wire, cream separators, carbon electrodes, typesetting and typesetting machines, and coke. Lower duties would have been put into effect on agricultural machinery and implements, cutlery and plated ware, motor vehicles and bathroom fixtures. The United States would have made a one-sided reduction in the duties on imports of aluminum, iron ore and coal slack.

Belgian Steel Making

The Hainaut steel works were in operation in late June, according to *L'Usine*, rolling rails of 50 kilos per meter (100 lb. per yard) for the Belgian State railroads, and rails of 23 and 32 kilos (46 and 65 lb.) for the Vicinaux railroads.

The Ougrée company in early July was soon to follow at its Ranange works, and then were to come into operation the Sambre-et-Moselle, the Angleur, and the Cockerill Works, so that by September five or six Belgian plants would be working on rails, some intermittently and others regularly.

Will Re-enter Sheet Business

YOUNGSTOWN, OHIO, July 29.—Charles S. Thomas, former president of the Deforest Sheet & Tin Plate Co., Niles, Ohio, is planning to re-enter the sheet steel industry, he has announced. His plans are still immature.

The U. S. Naval Ordnance Plant, South Charleston, W. Va., is in need of steel plant draftsmen. The pay is from \$4 to \$8 for a 7-hr. day. Applications should be addressed to the Inspector of Ordnance in Charge, U. S. Naval Ordnance Plant, South Charleston, W. Va.

An End-Door Baling Press

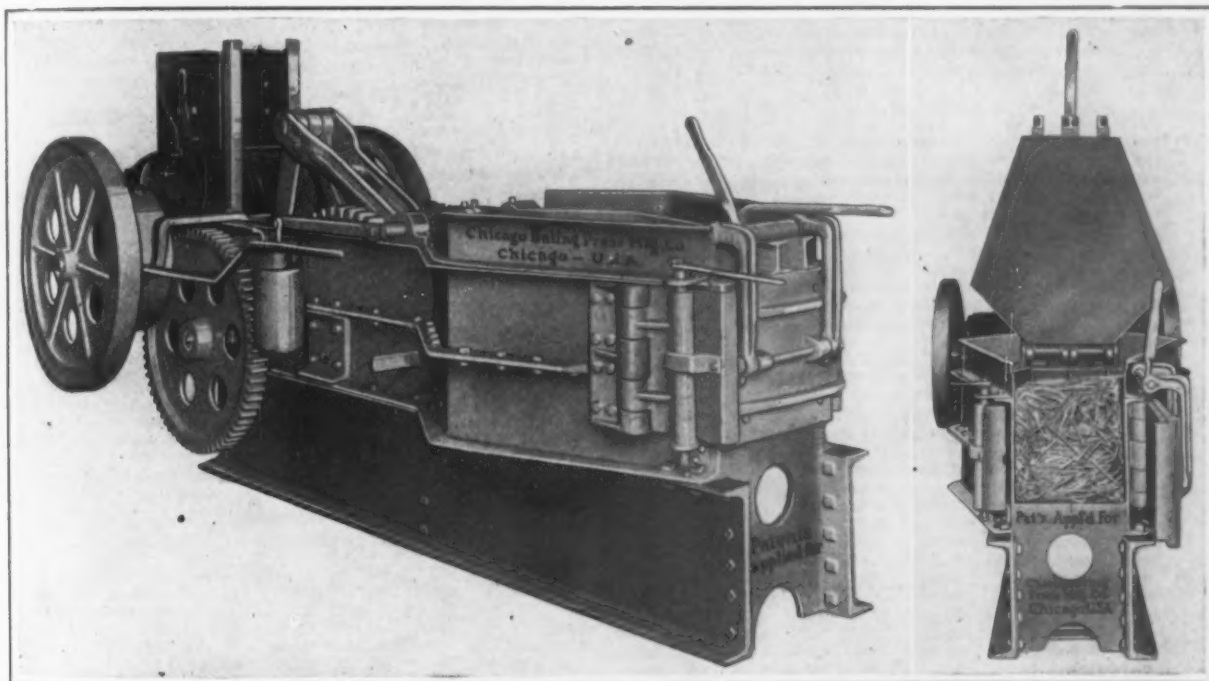
A scrap metal busheling press fitted with an end door which permits the operator to draw out the bale instead of lifting it over the top of the compression chamber is announced by the Chicago Baling Press Mfg. Co., 305 South LaSalle Street, Chicago. With this design the output of the machine, it is asserted, is materially increased. The door is hinged on one side at the end of the pressing box and is secured on the other side by a hinged clamp, which is locked by an eccentric rod operated by a lever. An additional clamp hinged on the door, laps over the cover of the compression box when closed, and is fastened by a second eccentric rod actuated by a lever.

Not only are these fastenings designed to withstand the pressure at the end and top of the compression chamber, but to provide an additional safeguard the ends of the structural shapes forming the frame are welded to the end plate under the door, and to the channel base on which the box rests. The compression box is a part of the frame which is made of four 9-in., 25-lb. steel channels, pressed to shape and extending the entire length of the press. The frame is bolted to a base consisting of a pair of 15-in., 40-lb. steel channels.

The machine is geared to a motor drive. The clutch lever is connected with the male half of the clutch,

Hillman Coal & Coke Co. Expansion

The Hillman Coal & Coke Co., Pittsburgh, has purchased control of the Diamond Coal & Coke Co. and thus becomes the country's second largest shipper of Pittsburgh coal. The Diamond Coal & Coke Co. properties consist of the Blaine, Houston Run, Diamond and Pike mines in the thin vein Youghiogheny gas coal district; also the Oakmont mine, on the Allegheny river, near Oakmont, Pa., which produces high grade coal suitable for by-product coke ovens. The Diamond company also had a fleet of three steamboats and about 100 barges on the Monongahela, Allegheny and Ohio rivers, which will now be operated in connection with the Hillman Transportation Co.'s similar fleet of steamboats and barges. The Hillman Coal & Coke Co., formerly the United Coal Corporation, now operates all the mines of the latter, including Patterson, Ella and Naomi in the Youghiogheny district and Edna Nos. 1 and 2 mines in the Westmoreland district, producing gas coal, and the Jerome mines Nos. 1 and 2 in the Somerset field, producing about 100,000 tons monthly of low volatile coal, used for steam and vessel fuel and in by-product coke ovens. The company now controls all the properties formerly operated by J. H. Hillman & Sons Co., namely, those of the Hecla Coal & Coke Co., which has the Griffin



The End Door on This Scrap Metal Busheling Press Permits of Drawing Out the Bob Instead of Lifting It Over the Top of the Compression Chamber. The side view of the press shows the cover and end door closed, and the end view, both doors open and the bale ready to be withdrawn.

which is on the flywheel shaft. When the lever is operated, it engages the female half of the clutch on the pinion shaft, the latter revolving inside the flywheel shaft. The machine is fitted with a clutch releasing device to stop the press at the completion of one revolution of the crankshaft, or a full cycle of the operation. A train of gears is provided to give the proper speed to the gear crank actuating the pitman, which makes one stroke per bale. The plunger-head, which is fitted on the end of the pitman, is provided with wings which follow the sides of the compression chamber during operation and thereby exert increasing lateral pressure on the bale as they approach the narrow end of the box. Between the pitman and the plunger-head is a concave cast-iron block designed to break if the machine is overburdened, thus to save the remainder of the press from injury.

The baling press illustrated is 11½ ft. long and 4½ ft. wide and can be operated by one man. The same size is manufactured with a belt drive from a line shaft. Two smaller presses are manufactured, arranged for either motor drive or belt drive.

Nos. 1 and 2 mines, Isabella Nos. 1 and 2 mines, Humphreys, Crystal, Luzerne and Belle Vernon mines, all of which have rectangular and beehive coke ovens and produce standard Connellsville coke and Connellsville by-product coking coal. It also controls the output of the Thompron-Connellsville Nos. 1 and 2 plants, producing Connellsville coke and coking coal, the output of the Lilley Coal & Coke Co., which has a capacity of 2000 to 3000 tons daily of Youghiogheny gas coal, and that of the Clarksville Gas Coal Co. The Hillman Coal & Coke Co. has now an output of about 25,000 tons daily of high grade coals for gas, steam, metallurgical and coking purposes, and a production of about 2,000,000 tons annually of Connellsville coke. The general offices of the company are in the First National Bank Building, Pittsburgh, and branch offices are maintained in the Whitehall Building, New York; Pennsylvania Building, Philadelphia; Prudential Building, Buffalo, and Maryland Trust Building, Baltimore.

The Newton Steel Co., Newton Falls, Ohio, will install a Fuller powdered coal plant in its new sheet mill.

Production of Ingots and Rolled Products

Statistics Compiled by the American Iron and Steel Institute Show Large Output in 1918 but not Equal to That of 1919

PRODUCTION OF STEEL INGOTS AND CASTINGS.

PRODUCTION OF STEEL INGOTS AND CASTINGS BY PROCESSES.

Years	Open-hearth.			Bessemer.	Crucible.	Electric.	Miscellaneous.	Total Gross tons.
	Basic.	Acid.	Total.					
1904	5,106,367	801,799	5,908,166	7,859,140	83,391	.....	9,190	13,859,887
1905	7,815,728	1,155,648	8,971,376	10,941,375	102,233	.....	8,963	20,023,947
1906	9,658,760	1,321,653	10,980,413	12,275,830	127,513	.....	14,380	23,398,136
1907	10,279,315	1,270,421	11,549,736	11,667,549	131,234	.....	14,075	23,362,594
1908	7,140,425	696,304	7,836,729	6,116,755	63,631	.....	6,132	14,023,247
1909	13,417,472	1,076,464	14,493,936	9,330,783	107,355	13,762	9,185	23,955,021
1910	15,292,329	1,212,180	16,504,509	9,412,772	122,303	52,141	3,194	26,094,919
1911	14,685,932	912,718	15,598,650	7,947,854	97,653	29,105	2,844	23,676,106
1912	19,641,502	1,139,221	20,780,723	10,327,901	121,517	18,309	2,853	31,251,303
1913	20,344,626	1,255,305	21,599,931	9,545,700	121,226	30,180	3,831	31,300,874
1914	16,271,129	903,555	17,174,684	6,220,846	89,869	24,009	3,622	23,513,030
1915	22,308,725	1,370,377	23,679,102	8,287,213	113,782	69,412	1,527	32,151,036
1916	29,616,658	1,798,769	31,415,427	11,059,039	129,692	168,918	604	42,773,680
1917	32,087,507	2,061,386	34,148,893	10,479,960	126,716	304,543	495	45,060,607
1918	32,476,571	1,982,820	34,459,391	9,376,236	115,112	511,364	329	44,462,432

PRODUCTION OF STEEL INGOTS.

1904	5,007,448	597,884	5,605,332	7,843,089	79,083	.....	2,172	13,529,676
1905	7,609,569	835,267	8,444,836	10,919,272	96,500	.....	2,572	19,463,180
1906	9,345,212	915,310	10,260,522	12,243,229	117,170	.....	3,510	22,624,431
1907	9,912,839	890,372	10,803,211	11,634,276	121,001	.....	989	22,559,477
1908	6,985,420	539,532	7,524,952	6,096,196	55,300	.....	519	13,677,027
1909	13,111,467	781,429	13,892,896	9,296,969	94,672	13,456	786	23,298,779
1910	14,858,353	782,805	15,641,158	9,354,437	107,671	50,821	.....	25,154,087
1911	14,419,306	608,153	15,027,459	7,890,753	83,623	27,227	417	23,029,479
1912	19,197,504	712,371	19,909,875	10,259,151	100,967	14,147	542	30,284,682
1913	19,884,465	805,250	20,689,715	9,465,200	103,655	20,973	587	30,280,130
1914	15,936,956	633,382	16,570,338	6,154,964	78,683	15,458	312	22,819,784
1915	21,975,622	968,148	22,943,770	8,194,737	99,026	46,348	331	31,284,212
1916	29,011,146	1,227,832	30,238,978	10,916,248	120,341	126,048	302	41,401,917
1917	31,528,939	1,406,798	32,935,737	10,320,688	122,882	239,632	261	43,619,200
1918	31,970,691	1,347,870	33,318,561	9,215,392	113,782	403,068	219	43,051,022

PRODUCTION OF STEEL CASTINGS.

1904	98,919	203,915	302,834	16,051	4,308	.....	7,018	330,211
1905	206,159	320,381	526,540	22,103	5,733	.....	6,391	560,767
1906	313,548	406,343	719,891	32,601	10,343	.....	10,870	773,705
1907	366,476	380,049	746,525	33,273	10,233	.....	13,096	803,117
1908	155,005	156,772	311,777	20,559	8,271	.....	5,613	346,220
1909	306,005	295,035	601,040	33,814	12,663	306	8,399	650,242
1910	433,976	429,375	863,351	58,335	14,632	1,320	3,194	940,832
1911	266,626	304,565	571,191	57,101	14,030	1,878	2,427	646,627
1912	443,998	426,850	870,848	68,750	20,650	4,162	2,311	968,621
1913	460,161	450,055	910,216	80,506	17,571	9,207	3,244	1,020,744
1914	334,144	270,173	604,317	65,882	11,186	8,551	3,310	693,246
1915	333,103	402,229	735,332	92,476	14,756	23,064	1,196	866,824
1916	605,512	570,937	1,176,449	142,791	9,351	42,870	302	1,371,703
1917	558,568	654,588	1,213,156	159,272	3,834	64,911	234	1,441,407
1918	505,880	634,950	1,140,830	160,844	1,330	108,296	110	1,411,410

In 1918, 212 works in 25 States and the District of Columbia made steel ingots, against 202 works in 26 States and the District of Columbia in 1917.

In 1918, 280 works in 30 States, the District of Columbia, and the Canal Zone, Panama, made steel castings, against 242 works in 27 States, the District of Columbia, and the Canal Zone, Panama, in 1917.

DUPLEX STEEL INGOTS AND CASTINGS.

Included in the 32,476,571 tons of basic open-hearth steel ingots and castings produced in 1918 are 3,870,017 tons of duplex steel ingots and castings which were made from metal partly purified in Bessemer converters and finally purified in basic open-hearth steel furnaces, against 3,791,830 tons in 1917, an increase of 78,187 tons, or 2.06 per cent. In 1916 the production was 3,436,457 tons and in 1915 it was 1,781,491 tons.

In 1918 duplex steel was produced by 10 works in 6 States, against 10 works in 6 States in 1917, 9 works in 5 States in 1916, 6 works in 4 States in 1915, and 5 works in 4 States in 1914.

ALLOY STEEL INGOTS AND CASTINGS.

PRODUCTION OF ALLOY STEEL INGOTS AND CASTINGS.

Years	Ingots	Castings	Total.	Years	Ingots	Castings	Total
1909	158,978	23,002	181,980	1914	577,107	69,846	646,953
1910	538,462	29,357	567,819	1915	923,251	97,896	1,021,147
1911	425,169	56,290	481,459	1916	1,306,157	56,458	1,362,615
1912	689,392	103,109	792,501	1917	1,576,806	67,529	1,644,335
1913	625,430	88,927	714,357	1918	1,721,367	66,485	1,787,852

PRODUCTION OF ALLOY STEEL INGOTS AND CASTINGS, BY PROCESSES, GROSS TONS, 1918.

Processes.	Ingots	Castings	Total.
Open-hearth steel—basic	1,013,913	10,724	1,024,637
Open-hearth steel—acid	323,913	29,191	353,104
Bessemer steel	41,286	23,430	64,716
Crucible steel	54,370	64	54,434
Electric steel	287,885	3,076	290,961
Total	1,721,367	66,485	1,787,852

In 1918 there were 133 works in 22 States and the District of Columbia which made alloy steel ingots or castings.

ROLLED IRON AND STEEL.

In 1918 the production of all kinds of iron and steel rolled into finished forms (including blooms, billets, and axle blanks rolled for forging purposes and semi-finished products which were rolled for export in that year) shows a decrease of 1,911,946 tons, or 5.78 per cent., as compared with the output in 1917.

TOTAL PRODUCTION OF ALL KINDS OF FINISHED ROLLED IRON AND STEEL, 1887-1918.

Years	Iron and steel rails	Plates and sheets	Nail plate.	Wire rods.	Structural shapes.	All other finished rolled products.	Total Gross tons.
1887	2,139,640	603,355	308,432	.....	.....	2,184,279	5,235,706
1888	1,403,700	609,827	289,891	279,769	.....	2,034,162	4,617,349
1889	1,522,204	716,496	259,409	363,851	.....	2,374,968	5,236,928
1890	1,885,307	809,981	251,828	457,099	.....	2,618,660	6,022,875
1891	1,307,176	678,927	223,312	536,607	.....	2,644,941	5,390,963
1892	1,551,844	751,460	204,242	627,829	453,957	2,579,452	6,165,814
1893	1,136,458	674,345	136,113	537,272	387,307	2,104,190	4,975,685
1894	1,021,772	682,900	108,262	673,402	360,305	1,795,570	4,642,211
1895	1,306,135	991,459	95,085	791,130	517,920	2,467,845	6,189,574
1896	1,122,010	965,776	72,137	623,968	495,571	2,236,361	5,615,841
1897	1,047,892	1,207,286	94,054	970,736	583,790	2,497,970	7,001,728
1898	1,981,241	1,448,301	70,188	1,071,683	702,197	3,239,760	8,513,370
1899	2,272,700	1,903,505	85,015	1,036,398	850,376	4,146,425	10,294,419
1900	2,385,682	1,794,528	70,245	846,291	815,161	3,575,536	9,487,443
1901	2,874,639	2,254,425	68,850	1,365,934	1,013,150	4,772,329	12,349,327
1902	2,947,933	2,665,409	72,936	1,574,293	1,300,326	5,383,219	13,944,116
1903	2,992,477	2,599,665	64,102	1,503,455	1,095,813	4,952,185	13,207,697
1904	2,284,711	2,421,398	61,801	1,699,028	949,146	4,597,497	12,013,381
1905	3,375,929	3,532,230	64,542	1,808,688	1,660,519	6,398,107	16,840,015
1906	3,977,887	4,182,156	54,211	1,871,614	2,118,772	7,383,828	19,588,468
1907	3,633,654	4,248,832	52,027	2,017,583	1,940,352	7,972,374	19,864,822
1908	1,921,015	2,649,693	45,747	1,816,949	1,063,181	4,311,608	11,828,193
1909	3,023,845	4,234,346	63,746	2,335,685	2,275,562	7,711,506	19,644,690
1910	3,636,031	4,955,484	45,294	2,241,830	2,266,890	8,476,750	21,621,279
1911	2,822,790	4,488,049	48,522	2,450,453	1,912,367	7,316,990	19,039,171
1912	3,327,915	5,675,080	45,331	2,653,553	2,846,487	9,908,476	24,656,841
1913	3,602,780	5,751,037	37,503	2,464,807	3,004,972	10,030,144	24,791,243
1914	1,945,095	4,719,246	38,573	2,431,714	2,031,124	7,204,444	18,370,106
1915	2,204,203	6,077,694	31,929	3,095,907	2,437,003	10,546,188	24,392,924
1916	2,854,518	7,453,980	30,088	3,518,746	3,029,964	15,493,093	32,380,389
1917	2,944,161	8,267,616	22,864	3,137,138	3,110,000	15,585,921	33,067,700
1918	2,540,892	8,709,135	18,310	2,562,390	2,849,969	14,385,058	31,155,754

Rolled blooms and billets for forging purposes are included from 1905, while semi-finished products rolled for export are included for 1912 and subsequent years. Prior to 1892 structural shapes were included in "all other finished rolled products."

PRODUCTION OF FINISHED ROLLED PRODUCTS, SHOWING IRON AND STEEL PRODUCTS SEPARATELY, GROSS TONS, 1907-1918.

Years	Iron	Steel	Total	Years	Iron	Steel	Total
1907	2,200,086	17,664,736	19,864,822	1913	1,678,257	23,112,986	24,791,243
1908	1,238,449	10,589,744	11,828,193	1914	1,167,776	17,202,420	18,370,196
1909	1,709,431	17,935,259	19,644,690	1915	1,294,833	23,098,091	24,392,924
1910	1,740,156	19,881,123	21,621,279	1916	1,822,571	30,557,818	32,380,389
1911	1,460,615	17,578,556	19,039,171	1917	1,867,757	31,199,943	33,067,700
1912	1,637,582	23,019,259	24,656,841	1918	1,573,976	29,581,778	31,155,754

PRODUCTION OF ALL KINDS OF FINISHED ROLLED IRON AND STEEL, BY STATES, GROSS TONS, 1914-1918.

States	1914	1915	1916	1917	1918
Maine, Massachusetts	139,179	184,273	217,589	218,962	181,113
Rhode Island, Conn.	55,265	66,455	75,111	81,235	81,317
New York	681,655	994,334	1,322,988	1,492,769	1,640,182
New Jersey	143,357	181,017	235,739	238,972	217,480
Pennsylvania	9,070,085	11,992,840	15,428,563	15,018,871	13,836,445
Delaware, Virginia	28,705	25,047	37,337	62,403	41,584
Maryland	170,723	220,725	385,708	368,458	416,213
West Virginia	456,108	534,134	777,328	831,594	731,477
Kentucky, North Car.	151,422	169,571	332,797	322,444	239,224
Tennessee, Ga., Texas	61,229	73,139	856,445	884,500	755,468
Alabama	413,654	556,222	5,461,024	6,141,465	6,171,332
Ohio	3,491,464	4,733,612	2,919,004	3,135,689	2,844,429
Indiana	1,512,486	2,104,072	2,686,674	2,713,428	2,470,223
Illinois	1,444,270	1,889,964	471,802	696,605	733,038
Michigan	11,379	21,515	150,603	146,388	115,085
Wisconsin, Minnesota	119,422	157,575	518,043	573,660	514,170
Missouri, Olla., Kansas	49,473	81,042	140,239	166,974	
Colorado, Utah, Wash.	325,343	356,924			
California	44,977	49,860			
Total	18,370,196	24,392,924	32,380,389	33,067,700	31,155,754

PRODUCTION OF FINISHED ROLLED IRON AND STEEL BY LEADING PRODUCTS, GROSS TONS, 1918.

Products	Iron	Steel	Total
Rails		2,540,892	2,540,892
Plates and sheets	14,657	8,784,478	8,799,135
Nail and spike plate	16	18,294	18,310
Wire rods	2,989	2,559,401	2,562,390
Structural shapes	774	2,849,195	2,849,969
Merchant bars	846,898	5,395,851	6,242,749
Bars for reinforced concrete work	468	344,152	344,620
Skip, flue, and pipe iron or steel	258,500	2,305,311	2,564,011
Long angle splice bars, tie-plate bars, etc.	49,475	367,430	416,905
Hoops		262,281	262,281
Bands and cotton-ties	497	250,270	250,767
Rolled sheet piling, not including fabricated		11,689	11,689
Railroad ties		6,438	6,438
Rolled forging blooms, forging billets, etc.		1,659,118	1,659,118
Exports of blooms, billets, sheet bars, etc.	7,838	824,908	832,746
All other finished rolled products	391,864	1,401,870	1,793,734
Total	Gross tons	1,573,976	29,581,778

In addition to the 11,689 tons of rolled sheet piling above reported, there were produced by rolling mills and steel works in 1918 about 1,742 tons of fabricated sheet piling, as compared with 5,294 tons of the same kind of piling in 1917.

PRODUCTION OF FINISHED ROLLED FORMS BY STATES, 1917-1918, SHOWING IRON AND STEEL SEPARATELY.

States	1917—Gross tons			1918—Gross tons		
	Iron	Steel	Total	Iron	Steel	Total
Me., Mass.	24,215	194,747	218,962	23,112	158,001	181,113
R. I., Conn.	9,489	71,766	81,255	9,832	71,485	81,317
New York	82,716	1,410,053	1,492,769	77,068	1,563,114	1,640,182
New Jersey	40,543	198,429	238,972	30,108	187,372	217,480
Pennsylvania	793,551	14,225,320	15,018,871	688,310	13,148,135	13,836,445
Delaware, Va.	27,058	35,345	62,403	22,889	18,695	41,584
Maryland	2,511	365,947	368,458	2,055	414,156	416,213
West Virginia	1,642	829,952	831,594	5,241	726,236	731,477
Ky., Tenn., N. C., Ga., Tex.	61,229	271,215	322,444	50,786	188,438	239,224
Alabama	1,022	883,478	884,500	4,579	750,889	755,468
Ohio	192,418	5,949,047	6,141,465	169,490	6,001,842	6,171,332
Indiana	306,504	2,829,185	3,135,689	204,535	2,639,894	2,844,429
Illinois	175,528	2,837,900	2,713,428	133,106	2,337,117	2,470,223
Mich., Wis., Mo.		696,605	696,605	3,766	729,272	733,038
Mo., Okla.	112,265	34,121	146,388	89,385	25,700	115,085
Colorado, Utah, Washington	30,224	543,436	573,660	39,810	474,360	514,170
California	16,842	123,397	140,239	19,904	147,070	166,974
Total	1,867,757	31,199,943	33,067,700	1,573,976	29,581,778	31,155,754

Of the total production in 1918, about 94.9 per cent. was rolled from steel, as compared with about 94.4 per cent. in 1917.

Of the total production in 1918, 44.41 per cent. was rolled in Pennsylvania, as compared with 45.42 per cent. in 1917; and in 1918, 19.81 per cent. was rolled in Ohio, as compared with 18.57 per cent. in the previous year.

In 1918 there were 400 plants in 29 States which rolled finished forms of iron or steel, as compared with 387 plants in 29 States in 1917.

PRODUCTION OF PLATES AND SHEETS.

PRODUCTION OF IRON AND STEEL PLATES AND SHEETS, 1889-1918.

Years	Gross tons	Years	Gross tons	Years	Gross tons
1889	716,496	1899	1,903,505	1909	4,234,346
1890	809,981	1900	1,794,528	1910	4,955,484
1891	678,927	1901	2,254,425	1911	4,488,049
1892	751,460	1902	2,665,409	1912	5,875,080
1893	674,345	1903	2,599,665	1913	5,761,037
1894	682,900	1904	2,421,398	1914	4,719,246
1895	991,459	1905	3,332,230	1915	6,077,694
1896	965,770	1906	4,182,156	1916	7,453,980
1897	1,207,286	1907	4,248,532	1917	8,267,616
1898	1,448,301	1908	2,649,693	1918	8,799,135

PRODUCTION OF PLATES AND SHEETS BY KINDS, 1917-1918.

Kinds	1917—Gross tons			1918—Gross tons		
	Iron	Steel	Total	Iron	Steel	Total
Universal plates	5,975	1,189,224	1,195,199	3,832	1,230,950	1,234,782
Sheared plates—						
Rolled on single stands	2,025	2,394,340	2,396,365	504	3,124,545	3,125,049
Roughed and fin. on sep. stands		566,674	566,674		760,077	760,077
Black sheets made on sheet or job. mills	20,416	2,347,336	2,367,752	10,321	2,063,318	2,073,639
Black plates, inc. black plates for tinning and black plate specialties rolled on tin mills	655	1,740,971	1,741,626		1,605,588	1,605,588
Total	29,071	8,238,545	8,267,616	14,657	8,784,478	8,799,135

PRODUCTION OF PLATES AND SHEETS BY SIZE AND MODE OF MANUFACTURE, GROSS TONS, 1918.

Kinds of products	Iron	Steel	Total
Universal plates, inc. flats or bars over 6 in. wide:			
$\frac{1}{4}$ of an inch and over in thickness	3,832	1,199,832	1,203,664
Under $\frac{1}{4}$ of an inch thick		31,118	31,118
Total universal plates	3,832	1,230,950	1,234,782
Sheared plates:			
$\frac{1}{4}$ of an inch and over in thickness	458	3,444,826	3,445,284
Under $\frac{1}{4}$ of an inch thick	46	439,796	439,842
Total sheared plates	504	3,884,622	3,885,126
Black sheets, made on either sheet or job. mills:			
No. 12 gauge and thicker	88	405,475	405,563
No. 13 gauge and thinner	10,233	1,657,843	1,668,076
Total black sheets	10,321	2,063,318	2,073,639
Black plates rolled on tin mills:			
Black plates for tinning		1,502,690	1,502,690
Other black plate specialties		102,898	102,898
Total black plates rolled on tin mills		1,605,588	1,605,588
Grand total of plates and sheets	14,657	8,784,478	8,799,135

PRODUCTION OF SHEARED PLATES ACCORDING TO MODE OF MANUFACTURE, GROSS TONS, 1918.

Mode of manufacture	Iron	Steel	Total
Sheared plates, rolled on single stands of rolls:			
$\frac{1}{4}$ of an inch and over in thickness	458	2,949,274	2,949,732
Under $\frac{1}{4}$ of an inch thick	46	175,271	175,317
Total rolled on single stands	504	3,124,545	3,125,049
Sheared plates, roughed and fin. on sep. stands:			
$\frac{1}{4}$ of an inch and over in thickness		495,552	495,552
Under $\frac{1}{4}$ of an inch thick		264,525	264,525
Total roughed and fin. on sep. stands		760,077	760,077
Total sheared plates	504	3,884,622	3,885,126

PRODUCTION OF UNIVERSAL PLATES BY WIDTHS, SHOWING IRON AND STEEL SEPARATELY, GROSS TONS, 1918.

Width of universal plates	Iron	Steel	Total
Under 30 inches wide	3,832	915,616	919,448
30 inches wide, but under 48 inches wide		171,468	171,468
48 inches wide and over		143,966	143,966
Total	3,832	1,230,950	1,234,782

PRODUCTION OF IRON AND STEEL BLACK PLATES FOR TINNING, 1895-1918.

Years.	Gross tons.	Years.	Gross tons.	Years.	Gross tons.
1895.....	129,615	1903.....	490,652	1911.....	795,598
1896.....	185,387	1904.....	472,509	1912.....	982,197
1897.....	271,896	1905.....	507,587	1913.....	827,266
1898.....	345,254	1906.....	576,079	1914.....	938,181
1899.....	375,000	1907.....	504,072	1915.....	1,093,345
1900.....	315,000	1908.....	513,771	1916.....	1,283,802
1901.....	398,026	1909.....	606,482	1917.....	1,513,772
1902.....	365,743	1910.....	712,137	1918.....	1,502,690

PRODUCTION OF BLACK PLATES FOR TINNING, SHOWING IRON AND STEEL SEPARATELY, GROSS TONS, 1904-1918.

Years.	Iron.	Steel.	Total.	Years.	Iron.	Steel.	Total.
1904.....	2,981	469,588	472,569	1912.....	5,378	976,819	982,197
1905.....	3,152	504,435	507,587	1913.....	2,779	824,487	827,266
1906.....	5,666	570,413	576,079	1914.....	2,272	935,909	938,181
1907.....	3,161	500,911	504,072	1915.....	2,038	1,091,307	1,093,345
1908.....	2,954	510,817	513,771	1916.....	1,578	1,281,924	1,283,802
1909.....	4,261	602,221	606,482	1917.....	655	1,513,117	1,513,772
1910.....	2,893	709,244	712,137	1918.....	.....	1,502,690	1,502,690
1911.....	3,515	792,083	795,598	.....	.....	.....	.....

Similar statistics for earlier years are not available. In 1918, 33 works made black plates for tinning, against 32 in 1917.

PRODUCTION OF NAIL PLATE.

PRODUCTION OF IRON AND STEEL NAIL PLATE, 1888-1918.

Years.	Gross tons.	Years.	Gross tons.	Years.	Gross tons.	Years.	Gross tons.
1888.....	289,591	1896.....	72,137	1904.....	61,601	1912.....	45,331
1889.....	259,409	1897.....	94,054	1905.....	64,542	1913.....	37,603
1890.....	251,528	1898.....	70,188	1906.....	54,211	1914.....	38,573
1891.....	223,312	1899.....	85,015	1907.....	52,027	1915.....	31,929
1892.....	201,242	1900.....	70,245	1908.....	45,747	1916.....	30,088
1893.....	136,113	1901.....	68,850	1909.....	63,746	1917.....	22,864
1894.....	108,262	1902.....	72,936	1910.....	45,294	1918.....	18,310
1895.....	95,085	1903.....	64,102	1911.....	48,522	.....	.....

Six plants in 5 States rolled iron or steel nail or spike plate in 1918, against 7 plants in 5 States in 1917.

PRODUCTION OF WIRE RODS.

PRODUCTION OF WIRE RODS, GROSS TONS, 1888-1918.

Years.	Tons.	Years.	Tons.	Years.	Tons.	Years.	Tons.
1888.....	279,769	1896.....	623,986	1904.....	1,699,028	1912.....	2,553,553
1889.....	363,551	1897.....	970,736	1905.....	1,808,688	1913.....	2,464,807
1890.....	457,099	1898.....	1,071,683	1906.....	1,871,614	1914.....	2,431,714
1891.....	536,607	1899.....	1,036,398	1907.....	2,017,583	1915.....	3,095,907
1892.....	627,829	1900.....	846,291	1908.....	1,816,949	1916.....	3,518,746
1893.....	537,272	1901.....	1,365,934	1909.....	2,335,885	1917.....	3,137,138
1894.....	673,402	1902.....	1,574,293	1910.....	2,241,830	1918.....	2,562,390
1895.....	791,130	1903.....	1,503,455	1911.....	2,450,453	.....	.....

Small quantities of copper-clad steel wire rods are included.

PRODUCTION OF STRUCTURAL SHAPES.

PRODUCTION OF STRUCTURAL SHAPES, GROSS TONS, 1892-1918.

Years.	Tons.	Years.	Tons.	Years.	Tons.
1892.....	453,957	1901.....	1,013,150	1910.....	2,266,890
1893.....	387,307	1902.....	1,300,326	1911.....	1,912,367
1894.....	360,305	1903.....	1,095,813	1912.....	2,846,487
1895.....	517,920	1904.....	949,146	1913.....	3,004,972
1896.....	495,571	1905.....	1,660,519	1914.....	2,031,124
1897.....	583,790	1906.....	2,118,772	1915.....	2,437,003
1898.....	702,197	1907.....	1,940,352	1916.....	3,029,964
1899.....	850,376	1908.....	1,083,181	1917.....	3,110,000
1900.....	816,161	1909.....	2,275,562	1918.....	2,849,969

PRODUCTION OF HEAVY AND LIGHT STRUCTURAL SHAPES, GROSS TONS, 1912-1918.

Years.	Heavy shapes	Light shapes	Total
1912.....	2,470,415	376,072	2,846,487
1913.....	2,553,806	451,166	3,004,972
1914.....	1,787,281	243,843	2,031,124
1915.....	2,031,407	405,596	2,437,003
1916.....	2,649,961	380,003	3,029,964
1917.....	2,575,810	534,190	3,110,000
1918.....	2,438,126	411,843	2,849,969

All the heavy structural shapes were rolled from steel.

PRODUCTION OF MERCHANT BARS.

PRODUCTION OF MERCHANT BARS, SHOWING IRON AND STEEL MERCHANT BARS SEPARATELY, GROSS TONS, 1905-1918.

Years.	Iron.	Steel.	Total.	Years.	Iron.	Steel.	Total.
1905.....	1,322,439	2,271,162	3,593,601	1912.....	944,790	2,762,324	3,697,114
1906.....	1,481,348	2,510,852	3,992,200	1913.....	1,026,532	2,930,977	3,957,509
1907.....	1,440,356	2,530,632	3,970,988	1914.....	563,171	1,960,460	2,523,631
1908.....	685,233	1,301,405	1,986,638	1915.....	657,107	3,474,135	4,131,242
1909.....	952,230	2,311,301	3,263,531	1916.....	993,948	5,236,354	6,230,302
1910.....	1,074,163	2,711,568	3,785,731	1917.....	983,926	5,226,031	6,209,957
1911.....	835,625	2,211,737	3,047,362	1918.....	846,898	5,395,851	6,242,749

PRODUCTION OF CONCRETE BARS.

PRODUCTION OF CONCRETE BARS, SHOWING IRON AND STEEL CONCRETE BARS SEPARATELY, GROSS TONS, 1909-1918.

Years.	Iron.	Steel.	Total.	Years.	Iron.	Steel.	Total.
1909.....	.....	159,352	159,352	1914.....	.....	288,471	288,471
1910.....	4,645	236,464	241,109	1915.....	.....	353,408	353,408
1911.....	2,388	256,353	258,741	1916.....	2,883	458,717	461,600
1912.....	2,500	271,532	274,332	1917.....	1,497	469,687	471,184
1913.....	113	319,557	319,670	1918.....	468	344,152	344,620

Statistics are not available prior to 1909.

PRODUCTION OF SKELP.

PRODUCTION OF SKELP, SHOWING IRON AND STEEL SKELP SEPARATELY, GROSS TONS, 1905-1918.

Years.	Iron.	Steel.	Total.	Years.	Iron.	Steel.	Total.
1905.....	452,797	983,198	1,435,995	1912.....	327,012	2,119,804	2,446,816
1906.....	391,517	1,137,068	1,528,585	1913.....	312,746	2,189,218	2,501,964
1907.....	444,586	1,358,091	1,802,677	1914.....	264,340	1,718,091	1,982,431
1908.....	297,049	853,534	1,150,583	1915.....	262,198	2,037,266	2,299,464
1909.....	370,151	1,663,230	2,033,381	1916.....	355,445	2,572,229	2,927,674
1910.....	350,578	1,477,610	1,828,194	1917.....	336,591	2,337,040	2,674,231
1911.....	322,397	1,658,276	1,980,673	1918.....	258,500	2,305,511	2,564,011

In 1918, 42 plants in 5 States rolled iron or steel skelp, as compared with 41 works in 6 States in 1917.

PRODUCTION OF MISCELLANEOUS ROLLED PRODUCTS.

PRODUCTION OF MISCELLANEOUS ROLLED IRON AND STEEL PRODUCTS, GROSS TONS, 1918.

Miscellaneous rolled products.	Iron.	Steel.	Total.
Hoops.....	.....	262,281	262,281
Bands and cotton-ties.....	497	250,270	250,767
Long angle splice bars, fish-plate bars, tie-plate bars, and other rail joint shapes.....	49,475	367,430	416,905
Roller sheet piling, not including fabricated.....	.....	11,689	11,689
Railroad ties.....	.....	6,438	6,438
Roller forging blooms, forging billets, etc.....	.....	1,659,118	1,659,118
Blooms, billets, sheet bars, etc., for export.....	7,838	824,908	832,746
Spike and chain rods, bolt and nut rods, horseshoe bars, strips, shafting, tires, etc.....	391,864	1,401,870	1,793,734
Total.....	449,674	4,784,004	5,233,678

PRODUCTION OF MISCELLANEOUS ROLLED PRODUCTS, GROSS TONS, 1914-1918.

Products.	1914.	1915.	1916.	1917.	1918.
Hoops.....	211,028	281,759	368,164	347,186	262,281
Bands and cotton-ties.....	345,919	437,987	562,555	490,893	250,767
Long angle splice bars, fish-plate bars, tie-plate bars, etc.....	423,052	535,615	691,820	606,824	416,905
Roller sheet piling.....	35,314	24,026	19,196	18,606	11,689
Railroad ties.....	33,249	42,269	34,311	9,103	6,438
Roller forging blooms and forging billets.....	331,524	650,545	2,015,960	1,801,708	1,659,118
Blooms, billets, sheet bars, tinplate bars, etc., for export.....	91,907	562,418	512,483	1,158,427	832,746
Spike and chain rods, bolt and nut rods, horseshoe bars, strips, shafting, tires, etc.....	837,918	1,227,455	1,669,228	1,797,802	1,793,734
Total.....	2,409,911	3,762,074	5,873,717	6,230,549	5,233,678

PRODUCTION OF MISCELLANEOUS IRON AND STEEL PRODUCTS IN THE UNITED STATES, 1918.

PRODUCTION OF TINPLATES AND TERNE PLATES.

PRODUCTION OF TINPLATES AND TERNE PLATES, 1891-1918.

Years	Tinplates.	Terne plates.	Total pounds.
1891 (second 6 months).....	368,400	1,868,343	2,236,743
1892 (calendar year).....	13,921,296	28,197,896	42,119,192
1893.....	64,536,209	59,070,498	123,606,707
1894.....	102,223,407	64,120,002	166,343,409
1895.....	165,927,907	88,683,488	254,611,395
1896.....	270,151,785	89,058,013	359,209,798
1897 (first 6 months).....	203,028,258	49,545,943	252,574,201
1897 (second 6 months).....			322,205,619
1898 (calendar year).....			732,289,600
1899.....			808,360,000
1900 (cen. year end. May 31)...	707,718,239	141,285,783	*850,004,095
1901 (calendar year).....			894,411,840
1902.....			806,400,000
1903.....			1,075,200,000
1904 (cen. year end. Dec. 31)...	867,526,985	158,857,866	*1,026,384,851
1905 (calendar year).....			1,105,440,000
1906.....	1,100,373,000	193,367,000	1,293,740,000
1907.....	996,650,000	156,447,000	1,153,097,000
1908.....	1,048,896,000	154,179,000	1,203,075,000
1909.....	1,179,858,000	190,930,000	1,370,788,000
1910.....	1,450,821,000	168,184,000	1,619,005,000
1911.....	1,597,629,000	158,441,000	1,756,070,000
1912.....	1,965,659,000	191,396,000	2,157,055,000
1913.....	1,708,186,000	136,944,000	1,845,130,000
1914.....	1,939,788,000	146,195,000	2,085,983,000
1915.....	2,201,826,054	163,470,646	2,365,296,700
1916.....	2,552,224,275	214,176,952	2,766,401,227
1917.....	3,233,314,911	153,891,653	3,387,206,564
1918.....	3,216,247,675	85,376,569	3,301,624,244

* Includes 1,000,473 pounds in 1900 and 6,555,855 pounds in 1904 of "other sheet iron and sheet steel, tin or terne plated."

PRODUCTION OF COKE AND CHARCOAL TINPLATES, 1918.

States.	Coke Pounds.	Charcoal Pounds.	Total Pounds.
Pennsylvania.....	1,584,075,920	19,844,801	1,603,920,721
Maryland, West Virginia.....	594,399,178	25,934,775	620,333,953
Ohio, Indiana, Ill., Michigan.....	984,811,366	7,181,635	991,993,001
Total.....	*3,163,286,464	52,961,211	3,216,247,675

* Includes 8,158,000 pounds which were formed or stamped from black plates by companies which manufacture tinplates and tinned after the completion of the forming or stamping process.

PRODUCTION OF FINISHED ANGLE SPICE BARS, TIE PLATES, FISH PLATES, ETC., BY ROLLING MILLS AND STEEL WORKS.

PRODUCTION OF RAIL JOINTS AND FASTENINGS, 1917-1918.

Articles.	1917—Gross tons.			1918—Gross tons.		
	Iron.	Steel.	Total.	Iron.	Steel.	Total.
Angle splice bars.....	4,453	177,504	181,957	3,663	133,601	137,264
Tie plates.....	55,148	193,977	249,125	36,713	125,168	161,881
Fish plates.....	791	20,513	21,304	652	10,135	10,787
Other rail joints.....	84	76,933	77,017	475	50,517	51,292
Total.....	60,476	468,927	529,403	41,503	319,721	361,224

It was necessary to estimate the output of one plant in 1918. The output of spikes, bolts, nuts, and similar fastenings is not included. There were 23 active works in 1918 and 25 in 1917.

PRODUCTION OF FORGED IRON AND STEEL BY ROLLING MILLS AND STEEL WORKS.

Years	Production—Gross tons.			Years	Production—Gross tons.		
	Iron.	Steel.	Total.		Iron.	Steel.	Total.
1909.....	25,523	223,741	249,264	1914.....	3,675	337,746	341,421
1910.....	20,410	299,452	319,862	1915.....	2,814	820,909	823,723
1911.....	4,034	214,202	218,236	1916.....	3,352	920,415	923,767
1912.....	9,155	383,365	392,520	1917.....	8,772	1,069,993	1,078,765
1913.....	27,892	380,091	407,983	1918.....	24,458	1,271,108	1,295,566

PRODUCTION OF GALVANIZED SHEETS.

PRODUCTION OF IRON AND STEEL GALVANIZED SHEETS AND GALVANIZED FORMED PRODUCTS, 1913-1918.

Years.	Galvanized sheets.			Years.	Galvanized formed products.*		
	Iron.	Steel.	Total.		Iron.	Steel.	Total.
1913.....	1,845,584,365		1,845,584,365	1914.....	129,189,480		1,975,053,545
1914.....	1,807,667,129		1,807,667,129	1915.....	131,603,609		1,939,270,738
1915.....	1,581,569,206		1,581,569,206	1916.....	112,192,790		1,693,761,996
1916.....	1,346,924,950		1,346,924,950	1917.....	130,302,195		1,477,227,145
1917.....	1,273,978,505		1,273,978,505	1918.....	114,902,171		1,388,880,976
1918.....	1,159,778,807		1,159,778,807		121,110,267		1,280,899,074

* Articles formed or stamped from iron or steel black plates or black sheets and galvanized after the completion of the forming or stamping process.

PRODUCTION OF CUT AND WIRE NAILS.

PRODUCTION OF WIRE NAILS IN 100-LB. KEGS, 1889-1918.

Years.	Production.	Exports.	Consumption.	Years.	Production.	Exports.	Consumption.
1889.....	2,435,000	19,172	2,415,828	1904.....	11,926,661	734,554	11,192,107
1890.....	3,135,911	18,395	3,117,516	1905.....	10,854,892	799,734	10,055,158
1891.....	4,114,385	18,986	4,095,399	1906.....	11,486,647	1,035,705	10,450,942
1892.....	4,719,524	21,387	4,698,137	1907.....	11,731,044	945,035	10,786,009
1893.....	5,095,945	27,451	5,068,494	1908.....	10,662,972	593,819	10,069,153
1894.....	5,681,801	38,920	5,642,881	1909.....	13,916,053	686,687	13,229,366
1895.....	5,841,403	53,012	5,788,391	1910.....	12,704,902	960,295	11,744,607
1896.....	4,719,860	95,638	4,624,222	1911.....	13,437,778	1,200,967	12,236,811
1897.....	8,997,245	129,767	8,867,478	1912.....	14,659,700	1,530,353	13,129,347
1898.....	7,418,475	307,190	7,111,285	1913.....	13,559,727	977,477	12,582,250
1899.....	7,618,130	750,781	6,867,349	1914.....	13,132,814	809,167	12,323,647
1900.....	7,233,979	613,858	6,620,121	1915.....	14,583,026	2,051,475	12,531,551
1901.....	9,803,822	420,506	9,383,316	1916.....	17,147,665	3,363,876	13,783,789
1902.....	10,982,246	595,391	10,386,855	1917.....	17,040,666	2,574,054	14,466,612
1903.....	9,631,661	704,546	8,927,115	1918.....	12,279,800	1,763,524	10,516,276

PRODUCTION OF CUT NAILS IN 100-LB. KEGS, 1889-1918.

Years.	Production.	Exports.	Consumption.	Years.	Production.	Exports.	Consumption.
1889.....	5,810,758	117,967	5,692,791	1904.....	1,283,362	207,720	1,075,642
1890.....	5,640,946	134,374	5,506,572	1905.....	1,357,649	176,741	1,180,908
1891.....	5,002,176	103,836	4,898,340	1906.....	1,189,239	169,519	1,019,720
1892.....	4,807,819	152,686	4,655,133	1907.....	1,109,138	155,212	953,926
1893.....	3,048,933	131,910	2,917,023	1908.....	956,182	157,319	798,863
1894.....	2,425,060	183,229	2,241,831	1909.....	1,207,597	222,565	985,032
1895.....	2,129,894	176,394	1,953,500	1910.....	1,005,233	182,067	823,166
1896.....	1,615,870	237,088	1,378,782	1911.....	967,636	255,554	711,782
1897.....	2,106,799	337,732	1,769,067	1912.....	978,415	208,568	769,847
1898.....	1,572,221	352,473	1,219,748	1913.....	842,038	84,885	757,153
1899.....	1,904,340	223,425	1,680,915	1914.....	769,665	76,676	692,989
1900.....	1,573,494	250,053	1,323,441	1915.....	775,327	94,878	680,449
1901.....	1,542,240	208,359	1,333,881	1916.....	764,835	106,451	658,384
1902.....	1,633,762	161,228	1,472,534	1917.....	461,674	101,362	360,312
1903.....	1,435,893	199,126	1,236,767	1918.....	418,811	85,668	333,143

PRODUCTION OF PIPES AND TUBES.

PRODUCTION OF WROUGHT IRON AND STEEL PIPE AND BOILER TUBES, 1917-1918.

Kinds of pipe.	1917—Gross tons.			1918—Gross tons.		
	Iron.	Steel.	Total.	Iron.	Steel.	Total.
Black, standard.....	90,119	969,628	1,059,747	74,871	940,914	1,015,785
Galvanized.....	25,949	249,356	275,305	20,209	244,473	264,682
Oil country goods.....	102,337	785,566	887,903	67,136	727,633	794,769
O. D. and misc.....	90	115,600	115,690		91,157	91,157
Boiler tubes.....	55,395	92,937	148,332	40,742	83,344	124,086
Total.....	273,890	2,213,087	2,486,977	202,958	2,087,521	2,290,479

In 1918 there were 25 active works, of which 19 made black, 15 made galvanized, 14 made oil country goods, 10 made O. D. and miscellaneous pipe, and 12 made boiler tubes.

PRODUCTION OF SEAMLESS STEEL TUBES, GROSS TONS, 1913-1918.

Years.	Hot finished.	Cold drawn.	Total.
1913.....	42,740	65,827	108,567
1914.....	36,939	53,656	90,595
1915.....	63,488	76,180	139,668
1916.....	61,235	129,238	190,473
1917.....	87,615	139,060	226,675
1918.....	142,308	150,586	292,894

PRODUCTION OF CAST IRON PIPE, NET TONS, 1917-1918.

Kinds of pipe.	1917—Net tons.			1918—Net tons.		
	Pipe.	Fittings.	Total.	Pipe.	Fittings.	Total.
Gas and water.....	696,097	52,076	748,173	455,319	52,981	508,300
Soil and plumbers.....	175,625	75,303	250,928	80,089	31,254	111,373
Total.....	871,722	127,379	999,101	535,408	84,235	619,673

* Includes culvert pipe. Manufacturers able to separate their production report 16,770 tons of culvert pipe in 1915 and 19,725 tons in 1917.

PRODUCTION OF HAMMERED CHARCOAL IRON BLOOMS, BILLETS, ETC.

Years.	For sale.	For own use.	Total Gross tons.	Years.	For sale.	For own use.	Total Gross tons.
1909.....	9,593	46,772	56,365	1914.....	5,026	35,399	41,425
1910.....	14,016	61,958	75,974	1915.....	902	42,219	43,121
1911.....	2,271	62,345	64,616	1916.....	5,405	75,350	80,755
1912.....	250	65,557	65,807	1917.....	7,641	81,284	88,925
1913.....	80	59,313	59,393	1918.....	8,300	74,757	83,057

ESTABLISHED 1855

THE IRON AGE

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Democracy and the Shop

There are widely differing opinions about "industrial democracy." What has been written on the subject since the armistice was signed would fill many volumes. There have been enthusiastic reviews of the workings, over a period of months, of employee representation, in some cases amounting simply to a works committee, while in others there is the more elaborately organized industrial council, and in yet others what is known as the house and senate. Some writers have found the real appeal of these plans to the employee in the fact that in one way or another they give him "some say in the running of the business." Profit sharing, these writers said, was good in its way, but unsatisfactory because it gave no chance for the employee to have this "say."

W. W. Atterbury, vice-president of the Pennsylvania Railroad Co., who was director-general of transportation for the American Expeditionary Forces, in speaking publicly last month of the view he had brought home from Europe of "the rights of those who labor," referring to "all who labor," whether with hands or head, summed these rights up in "(1) steady employment, (2) at a good wage, (3) time for recreation, (4) opportunity to elevate myself in my employment, (5) a voice in determining the rules and regulations under which I should work, (6) a fair division of any profits after a reasonable wage has been earned and a sufficient amount paid to capital to attract it to an expanding business."

We quote from Mr. Atterbury (who refers to the above platform as representing a very definite change in his thinking) simply to illustrate the new view many men are taking of the rights of employees as made plain by the war.

There will be many opinions as to the extent to which democracy can be practically realized in industry. When Great Britain was "muddling" her war work and when the United States, with divided counsels, was dallying with the war issue, it was common to say that in war democracies are ineffective and absolutism highly effective. When this country actually went to war military authority was supreme and the liberty of the individual citi-

zen was suppressed. "Military democracy" was plainly a misnomer.

What suggestion has this for the present movement to democratize industry? Will employees make the mistake that many men make who come to the United States in the belief that a land of freedom is a land in which every man has license to do as he pleases?

There is little testimony as yet as to the use employees have made of the new grant of power made to them by various companies. Some employers have been heard from who expressed great relief at having the men share their responsibilities. But it is perfectly evident that about things which the managers of the business know and employees do not know, since they have not been trained in them, there must be very definite limits to the grant of democracy in a business that is to succeed. "A voice in the rules and regulations" under which a man works is a general description of what in practice will be subject to widely different interpretations.

There can be no doubt that the military system as commonly prevalent in industry has been seriously at fault in putting a premium on a superintendent's or foreman's ability to drive his men. The new industrial democracy will inevitably break down this feature of a long-standing industrial militarism.

Full faith and credit should be given to the efforts now being put forth by forward-looking men in every industry to bring on a new and better day for "all who labor," as Vice-President Atterbury describes them. Only a beginning has been made, and militant, closed-shop unionism on the one hand and the stand-pat, run-my-own-business type of employers on the other are offering no encouragement. But there is no mistaking the spirit of good will and of man-to-man fairness behind the movement nor the number of capable men, proprietors and managers, who have been enlisted in it. That gives good promise that the plans now being worked out will be made effective means to a better understanding. Certainly nothing has yet been devised that in any like degree brings home to employees and managers the mutuality of their responsibilities and interests.

Steel Production in 1918

Completion of the steel production statistics for 1918 shows that the quantity of finished rolled steel available for war and commercial purposes was much less than was suggested by the monthly statistics of ingot production. The discrepancy was due to the heavy cropping of ingots involved in the manufacture of shell steel. Various uses were reported to have been found for discard steel, but if such reclamation was as important as was claimed, one can only wonder how much loss there would have been if all discard steel had gone into the scrap heap. The percentage that the reported production of finished rolled steel has constituted of the reported steel ingot production, year by year, is as follows:

	Per Cent.		Per Cent.
1912.....	76.01	1916.....	73.81
1913.....	76.33	1917.....	71.53
1914.....	75.38	1918.....	68.71
1915.....	73.84		

These steadily declining percentages, after 1914, clearly trace the continued increase in the production of shell steel, with the heavy discards involved.

Production of steel was approximately the same in 1912 and 1913 (30,284,682 and 30,280,130 tons of ingots respectively), and was much larger than in any preceding year, so that a clear cut pre-war basis is furnished for comparative purposes. One finds, then, that the 1918 ingot production, which was 43,051,022 tons, exceeded the pre-war record by 42.2 per cent, but the 1918 production of finished rolled steel represented a gain of only 28.2 per cent.

But finished steel was even scarcer for home use last year than this comparison would indicate. The production of rolled iron and steel in 1918, taken together, showed an increase from the mean of 1912 and 1913 of 26 per cent, finished iron falling off slightly. The actual production of rolled iron and steel was about 24,725,000 tons in 1912 and 1913, and it was 31,155,754 tons in 1918, an increase of only 6,430,000 tons.

Exports of rolled iron and steel (the statistics do not separate iron from steel) amounted to about 2,340,000 tons a year in the two pre-war years, while they amounted to 5,000,000 tons in 1918, representing an increase of 2,660,000 tons. This, deducted from the 6,430,000 tons increase in production, as above, left only 3,770,000 tons of the increase in finished material to stay at home; and not all of that tonnage did, for iron and steel moved to France in Government vessels, whether or not intended for the direct use of the American Expeditionary Force, was not cleared through the regular channels and therefore did not appear in the export statistics. With a large consumption of steel in the manufacture of shells in the United States, with a large consumption in the erection of Government works and in shipbuilding, it is clear that the amount of steel available for commercial consumers, even though their activities were diverted to direct or indirect war purposes, must necessarily have been greatly curtailed.

With the return to normal conditions as to the relation between steel ingot production and rolled steel production, the factor of 76 per cent, shown in 1912 and 1913, may be used. The present rate of ingot production is about 35,000,000 tons a year,

and this accordingly means rolled steel production at the rate of 26,500,000 tons a year. That is only 10 per cent under the rate of 1918, and it is 7 per cent above the average rate in 1912 and 1913. Production in those years was not altogether equal to the capacity just before the war, and thus it may be taken that our present production of rolled steel is equal to our full capacity just before the war. All that remains to do is to take up the slack caused by the increase in productive capacity.

The Railroad Uncertainty

Watchful waiting is still the attitude of the Railroad Administration, which announced last week that even as to rails no purchases are now contemplated, although there is little doubt that there should be considerable rail replacement in the remainder of the year.

The Railroad Administration is watching Congress, without seeing much that would interest it, and it is also watching railroad returns. The trend in earnings is in the right direction. In May the deficit to be made up by the Government was only about one-half the prescribed rental. At the rate of change shown from April to May the increase in earnings would make August show approximately the Government guarantee, but the bare statistical comparison is of course nothing like a safe criterion. At any rate the Director General seems quite indisposed to recommend rate advances just now.

This matter of rate advances is to be looked at from two distinct viewpoints. The Government guarantee or rental is one thing; fair treatment of the railroads in the future, an entirely different thing. There is no particular harm in the Railroad Administration waiting to decide whether discrepancies between the earning capacity and the rental shall be made up from the public funds or by advances in freight and passenger rates; but there is harm in awaiting future earnings statistics to determine how the railroads shall be treated in future. It would be extremely unjust to the railroads to base any decision upon their earnings in fair weather, say through next October, for the rigors of winter might, and probably will, make quite a change in the earnings. If the results of winter operation must be awaited, why not also the results of next summer's operations, and the following winter and summer, and so on indefinitely? There is no time in the future when the volume of traffic or the physical conditions surrounding railroad operations will be stable.

The steel industry can observe at close range the state of affairs in many of the country's important activities, by noting the volume of orders they place for steel. The record to date is this: that almost immediately after Nov. 11 the automobile industry became active, and in a short time was ordering more steel than ever before; that the petroleum industry began to buy freely, and that one by one other industries swung into line, getting back toward the peace time normal, the fabricated steel industry being perhaps the slowest of all, with the one notable exception, but being now headed clearly for a full stage of activity.

The one exception, the one steel consuming line

that has not swung partly or fully back into the normal stride as to steel buying, is the railroads.

Last February various Government officials declared their desire, a very reasonable and commendable one, that the Government should aid in restoring peace-time activity to the country. What has occurred is that those who have been permitted to manage their business themselves have swung into line, while the one activity in control of the Government has not.

A British Steel Problem

The position of acid steel in Great Britain is a matter of serious discussion. Acid steel has always been predominant there, the chief dependence for high-class work. High-grade foreign ore is now scarcer than ever and regular acid steel workers, particularly the Scottish, are not sure of their future business. The freight on these Spanish ores has advanced from 17 shillings some months ago to 30 shillings. Very little coal is available for export to Spain, resulting in a scarcity of return cargo. Thus the cost of imported ore per ton of pig iron is said to have reached something over £5, making the present prices of acid steel unremunerative.

Unless this situation can be corrected, British steel users will have to consume more basic steel or turn to the electric furnace. The latter course opens up a wide field and its possibilities are gradually being recognized in England and France. On this phase of the subject Donald F. Campbell, a British metallurgist of repute, has written to *London Engineering*:

Although war installations may be scrapped, a much wider application of the electric furnace will now begin. The future of French steel making in many cases will be a combination of the basic electric process and the phosphates of the ore will be a valuable by-product with the resulting steel better than the best basic open-hearth material. In this country (Great Britain), miscellaneous country scrap, mixed with the turnings which will reappear in reasonable quantities when the engineering industry again gets its stride, will furnish raw material for small foundries and a part of the Sheffield trade, while the refining of molten basic steel will again require careful consideration and is likely to find wide application in conjunction with the large tilting furnaces working the Talbot process, on the northeast coast and elsewhere. The possibility of recovering more phosphate fertilizers by enriching our Lincolnshire and Northhamptonshire ores with phosphoric limestone in the blast furnace and a wider application of the basic Bessemer electric process is not without interest.

Already French and Belgian steel makers are investigating the use of the electric unit for refining basic Bessemer steel and French engineers are now in this country for this purpose. In these particular cases advantage is to be taken of the removal of sulphur in the electric process. The possibilities in the British steel industry, either as regards the removal of sulphur or phosphorus, are evident and when it is considered that by the duplex or triplex process, using the electric furnace, better steel is possible than by the acid open-hearth, and in quantity too, the future of this phase of steel making is full of promise, not only in solving the present British problem but in more general use in the United States as well as in France. Already this country has blazed

the way. That the output of electric furnaces in the United States in 1918 reached over 511,000 gross tons as compared with 304,000 tons in 1917 was due principally to the use of large units refining open-hearth or Bessemer steel.

Figures of the alien emigration movement to Europe do not bear out the much talked of reduction of labor supply of the kind employed in iron and steel plants. The fact remains, of course, that large numbers are attempting to return for one reason and another to the land of their birth, but the advertising the exodus has been given, doubtless for purposes of stimulating wage increases, is far ahead of the fact. Passport offices are besieged by crowds, but many who apply are dissuaded by their country's official representatives. It is probable many will defer their departure, some indefinitely, but the yearning for the return and then the collapse of the plans are not calculated to induce the partly Americanized foreigners to hasten back to his waiting job, bearing in mind he doubtless carries well filled pockets. No doubt there is a rising tide of aliens leaving these shores, but contacts with consular officers have started some thinking and the labor shortage outlook on this score is probably not so black as it has been painted.

PREPARING FOR STRIKE VOTE

Twenty-four Unions Listed as Co-operating—Contract Evasion Unexplained

The national committee for organizing iron and steel workers which has its headquarters in the Magee Building, Pittsburgh, is actively engaged in preparing for the vote among iron and steel workers all over the country to determine the views of the men in regard to a general strike. The program of demands was printed in *THE IRON AGE* of July 24.

It is stated by Secretary W. Z. Foster that among the chief grievances of the men is that they have no representation with their employers, and he says that while they do not insist on the closed shop, they propose to insist that when a grievance arises a committee representing the men shall have a hearing from their employers.

The twenty-four co-operating international unions that are embraced in the proposed strike are as follows:

International Brotherhood of Blacksmiths, Brotherhood of Boiler-Makers and Iron Shipbuilders of America, United Brick and Clay Workers, Bricklayers, Plasterers and Masons' International Union of America, Bridge and Structural Iron Workers' International Association, Coopers' International Union of North America, International Brotherhood of Electrical Workers, International Brotherhood of Foundry Employees, Amalgamated Association of Iron, Steel and Tin Workers, International Association of Machinists, Metal Polishers' Union of North America, International Union of Mine, Mill and Smelter Workers, United Mine Workers of America, International Molders' Union of North America, Pattern Makers' League of North America, United Association of Plumbers and Steamfitters, Quarry Workers' International Union of North America, Brotherhood of Railway Car Men of America, International Seamen's Union of America, Amalgamated Sheet Metal Workers' International Alliance, International Brotherhood of Stationary Firemen, International Union of Steam Operating Engineers, International Brotherhood of Steam Shovel and Dredgemen, and Switchmen's Union of North America.

In the list of trades unions, the name of the Amalgamated Association of Iron, Steel and Tin Workers appears, and it will be recalled that late in June the bar iron, sheet and tin plate mills that sign the Amalgamated scales came to an agreement with the wage

committees of the association and signed a contract for the year beginning July 1. These contracts are in force and supposed to be binding.

When Secretary Foster was asked how a strike could take place in these mills in the face of the contracts for the year, he said he did not know what would be done in such cases. He said that in other trades, also, the men had contracts with their employers, and what would be done with these was not known.

Secretary Foster stated that reports that 20,000 out of 30,000 men reported as being employed in the mills of the Youngstown district had voted in favor of a strike is incorrect, as no vote has been taken yet in any of the iron and steel plants.

It is expected to start to take the vote early next week, but it may be a month or more before the results are known. Secretary Foster further said that owing to quiet work that had been done certain plants already had been pretty well organized. This was not done by vote among men, but by personal work. Organizers are said to be at work in practically every iron and steel plant of any importance, doing missionary work among the men, and doing all they can to induce the men to vote for a general strike. Committee meetings are held daily in the Magee Building, Pittsburgh, by representatives of various unions, and at these meetings reports are received from all over the country as to how the men are being organized.

STEEL CORPORATION EARNINGS

Improvement Over the First Quarter—June Best Month of Year

The United States Steel Corporation's report for the second quarter of the year 1919 shows net earnings of \$34,331,301 after deductions for Federal income and

Statement of United States Steel Corporation and Subsidiary Companies for the Quarter Ending June 30, 1919

EARNINGS			
	Earnings before charging interest on the Subsidiary Co.'s Bonds outstanding	Less: Interest on the Subsidiary Co.'s Bonds outstanding	Balance of Earnings
April, 1919..	\$11,760,275	\$732,882	\$11,027,393
May, 1919..	11,664,137	731,578	10,932,559
June, 1919..	13,095,929	724,580	12,371,349
	\$36,520,341	\$2,189,040	
Total earnings after deducting all expenses incident to operations, comprising those for ordinary repairs and maintenance of plants, allowances for estimated proportion of extraordinary cost, resulting from war requirements and conditions, of facilities installed and of inventories of materials on hand, also estimated taxes (including Federal income and war excess profits taxes), and interest on bonds of the subsidiary companies.....			
			\$34,331,301
Less charges and allowances for depreciation, applied as follows, viz.:			
To depreciation and extraordinary replacement funds and sinking funds on bonds of subsidiary companies..			
On sinking funds on U. S. Steel Corporation bonds			
		1,975,747	11,007,195
Net income			\$23,324,106
Deduct: Interest for the quarter on United States Steel Corporation bonds outstanding....			
Premium on bonds redeemed.....			
		5,356,819	
Balance			\$17,967,287
Dividends on stocks of the United States Steel Corporation, viz.:			
Preferred, 1 1/4 per cent.....			
Common, 1 1/4 per cent.....			
		12,658,700	
Balance of surplus for the quarter.....			\$5,308,587
UNFULFILLED ORDERS ON HAND			
June 30, 1919.....			4,892,855 tons

The net earnings for the past three years by quarters and for the first quarter of this year have been as follows:

Quarters	1919	1918	1917	1916
First	\$33,513,384	\$56,961,424	\$113,121,018	\$60,713,624
Second	34,331,301	62,557,391	90,579,204	81,126,048
Third		42,961,589	68,243,784	85,817,067
Fourth		36,354,165	59,724,125	105,968,347

war excess profits taxes, but as was the case for the first quarter, the financial statement does not give the

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amount of the allowance for taxes. The general improvement in the iron and steel industry experienced in June is reflected in the June earnings, which were about \$130,000 better than those of January and thus the best of the year so far.

The regular quarterly dividends of 1 1/4 per cent on the preferred stock and 1 1/4 per cent on the common were declared.

BOOK REVIEWS

Manufacturers' Instructors and Advisers.—By Frederic Meron, M.E., E.E. In three volumes, pocket size, flexible covers. Published by Theo. Audel Co., New York.

The three volumes mentioned above are respectively entitled: Layouts and Equipment of Factories, Common Sense Working Methods in Factories, and the Human Element in Organizations. These volumes are accompanied by a binder containing in loose form thirty-four special plates to accompany the text of the volumes, in addition to which the volumes themselves are profusely illustrated where necessary.

In an exceedingly frank, and at the same time somewhat novel fashion, the author of these little books has tried to present to the reader conditions which ordinarily prevail, and those which he recommends as desirable, in the average manufacturing establishment. Under layouts and equipments come criticisms of various arrangements that the author presumably has found in various plants, these arrangements pertaining to the general plant layout, storeroom layouts, details of storeroom arrangements, fire protections, machine and lineshaft layouts and various auxiliary departments, such as those for heat treating and case hardening. In similar fashion the second volume treats with the methods employed on the equipment mentioned in the first volume.

The third volume, which has to do with the human element in organizations, starts in with a discussion of what constitutes profit in business and then goes on to discuss various types of organizations, the treatment of employees by the management, the relations between employers and employees, and concludes with a brief description of the technical education of the industrial world.

E. C. R.

Office Administration. By J. William Schulze. Pages 295, 5½ x 8 in.; diagrams, 30. Published by McGraw-Hill Book Co., Inc., 239 West Thirty-ninth Street, New York.

The author is with William Demuth & Co., New York, and is the author of "The American Office." The aim is to present "those principles and methods which underlie efficient and economical office management in such a way as to meet the requirements of the ambitious potential executive, the student in university business courses and the business executive who has already arrived," but is constantly on the alert for more information." The book is valuable both for the beginner as a text book, and for the expert as a reference book, which describes in detail other and perhaps better office methods than those he is employing. Not only are the details of a system outlined, but the psychology and theory underlying them are expounded. In the opening chapter the author promises that "the book will dwell more particularly upon the human phases of office administration." By an extensive use of figures he pins his statements down to the concrete, thus carefully avoiding generalities. The book is marred by carelessness in spelling, printing and diction.

The A-B-C of Cost Engineering. By Robert S. Denham. Pages, 105, 4 x 6 in. Published by the Denham Costfinding Co., Cleveland.

Facts about cost engineering in general and about the Denham cost engineering service in particular are contained therein, though the description of the latter is confined to two chapters only. In the words of the author, "cost engineering makes it possible to increase profits, not so much by advancing prices as by revealing the weak points in the making and selling effort, so that especial attention may be given to strengthening them, thereby decreasing existent unseen losses which absorb part or all of the normal profits." The book points out the indifference to, and unscientific methods employed in, cost finding, with the result that it is often based on opinion, rather than upon ascertaining

of facts. The chapters are devoted to the mysteries of cost; definition of a cost system; cost engineering; getting the cost of the lot or order; cost records as a basis for estimating; auxiliaries of the cost system; system and red tape; the committee-made "uniform cost system" and the commercial cost engineering service, and the Denham system.

The Blind. By Harry Best, Ph. D. Pages 763, 5¼ x 7¾ in. Published by the MacMillan Co., New York.

Because of its exhaustive treatment, its many tables, appendices and footnotes, this book should prove valuable for reference. Facts and figures concerning those made blind in industry abound and should interest the safety or welfare executives of a plant. The book is divided into seven sections dealing with the general condition of the blind, possibilities of prevention, provision for the education of blind children, intellectual provision for the adult blind, material provision, interested organizations and conclusions with respect to the work for the blind.

Understanding South America. By Clayton Sedgwick Cooper. Pages, 426, 5½ x 8 in.; illustrations, 19. Published by George H. Doran Co., New York.

Though not adhering to the usual characteristics of a book on business, the pages contain facts concerning history, customs, race qualities and geographical features which the serious exporter should master in order to secure the desirable broad knowledge of a foreign people with whom he wishes to do business. The book is written in a style somewhat imaginative and poetic, and suggestive of the people of South America.

"How to Give Illustrated Lectures on Accident Prevention to Workmen" is the subject of a 13-page pamphlet issued by the Working Conditions Service of the United States Department of Labor. It emphasizes the fact that "thousands of dollars have been spent in safeguarding machinery, but little attention has been paid to the men who operate the mechanism"; that the pictures of strongest appeal are those portraying the result of accidents to families rather than to the men; that slides illustrating complicated guards are of vital interest only to safety engineers and plant executives; that the pictures should be preceded by short talks not over 40 min. long; that where there are many foreigners the meetings should be held in the dining room at noon or in some central location outside the plant from 7.30 to 8 p. m. with the families present.

"Industrial Training in Representative Industries," which is a survey of practical value to the man who wants to know how training departments operate, is contained in a recent pamphlet, bulletin No. 13, of the United States Training Service, Department of Labor. Outlines are given of the training departments of plants making the following: Hardware, locks, and small munitions; cylindrical and surface grinders; loom machinery and sewing machines; small tools and machine tools; also the Worcester Trade School, Worcester, Mass. Among the facts discussed are: cost of training, length of training, hours and wages, records and progress of the learner, methods of instruction and labor turnover.

The influence of very low percentage of copper in retarding the corrosion of steel is the subject of a booklet issued by the American Sheet & Tin Plate Co., Pittsburgh. This article is a reprint of a paper by D. M. Buck, metallurgical engineer American Sheet & Tin Plate Co., recently presented before the American Society for Testing Materials. The paper gives the results of tests of low sulphur and of high sulphur copper-bearing steels.

"Our Bit" is the subject of a booklet issued by the C. & G. Cooper Co., Mt. Vernon, Ohio. It explains with text and illustrations the company's part in the manufacture of high explosive shells, forging presses, gas engines, gas producers, marine engines and steam turbine castings for war purposes.

CORRESPONDENCE

Oxygen for Opening Frozen Notches

To the Editor: With reference to the communication of Randolph Bolling in THE IRON AGE of June 26, discussing the writer's article of June 19 on the opening of frozen iron notches:

Mr. Bolling's article is an interesting description of his effort to open the iron notch of the blast furnace in question by the use of oxygen. There seems to have been but one reason why this effort was not a success. He says: "Connecting up the porcelain combustion tube by means of (black iron) pipe and hose, I introduced the open end of the porcelain tube into the iron notch," etc.

Such an application will not open a frozen iron notch. Had he put the porcelain tube on the other end of the connection and introduced the iron pipe into the iron notch, his effort would have been a success, provided the notch was sufficiently hot, or provided he had thrown in some fuel such as soft coal. The iron pipe when brought to a high enough temperature combines with the oxygen (or *vice versa*) and produces an intense heat which melts and cuts the frozen material very rapidly. The porcelain tube would not unite with the oxygen, hence would be no good except in the presence of a combustible material or gas and used as a blow pipe. Carbon from the molten iron would also produce heat.

The writer is advised that some one in Johnstown, Pa., has a patent on the use of oxygen as applied to the opening of iron notches, etc.

E. P. ROSS.

Riddlesburg, Pa., July 25.

[Mr. Ross's reference in his concluding paragraph is presumably to U. S. patent 1,186,358 granted June 6, 1916, to Henry C. Witz, Johnstown, Pa.—EDITOR THE IRON AGE.]

The War Tax Burden Upon Industry

To the Editor: The subject of the Federal tax law has had a great deal of my attention and thought since the passage of same, regarding the proposed liquidation of the Government war debt in a period of but 21 years. My understanding is that the Government is to collect \$6,000,000,000 in 1919 and \$4,000,000,000 each year thereafter for 21 years.

I recently made a trip throughout the Mahoning Valley and the Pittsburgh district, during which time I heard many steel men express themselves on the policy of our Government undertaking to wipe out this enormous war debt in so short a period of time. It is my belief, concurred in by every manufacturer with whom I have talked, that if our Government attempts to collect so vast a sum in so short a time it will stifle industry.

I am constrained to ask the question: Can the Government take such an enormous sum from its partners without handicapping them in their production and tax-paying ability? The policy as set forth by this levy is sure to impair energy and is equally sure to discourage production of any manufacturing concern. It means the confiscation of 50 to 65 per cent of each individual's or industrial company's earnings.

Being a loyal citizen of the United States Government, it is my aim and desire to support and uphold it to the utmost, but the incentive to build up a successful business, to be a credit to the community as well as our country, is lost when over half of one's earnings are appropriated each year by our Government for taxation.

I believe there should be some immediate action taken by everyone concerned to have this law repealed, and in its stead to provide that for raising this vast sum of money the taxation should cover a period of eighty years, under which arrangement the business of the United States could not suffer as it is bound to by the enforcement of the present law.

I am a manufacturer, and like many others with

whom I have talked did not fully grasp the burdensome measures imposed on the business of the country at the time this law became effective; but now that we have paid our taxes we find that should we continue along the same lines, raising \$4,000,000,000 per annum, it will prove a great injustice to many industries in the United States.

My discussion with the different steel men throughout the Mahoning Valley has caused me to ask this question of myself: Why am I working with all the energy I possess to build up a business that is giving employment to many hundreds of people from the profits of which I have to pay a tax of from 50 to 65 per cent?

If this is to continue, there can be nothing but a disastrous ending, as there is no business in the United States that can prosper year after year under this burden.

Like many others I can stand it for one or two years, but when you figure that these conditions will remain with us for 20 years, we can see but one result—that of the slowing up of business and the paralyzing of many industries with its attendant failures.

W. J. BOYLE,

President Boyle Mfg. Co.

Los Angeles, Cal., July 15.

Foreign Missions Coming to Discuss International Trade

WASHINGTON, July 28.—Invitations extended by the Chamber of Commerce of the United States to Great Britain, France, Italy and Belgium for a joint commercial mission to visit this country in the fall have been accepted. The missions are due to arrive in time to participate at Atlantic City during the week of Sept. 29 in an International Trade Conference, to be attended by leaders in American business, who, with members of the missions will discuss international trade relations. After the conference the missions will tour the country, visiting the chief industrial and commercial centers. The return to Europe will be about Nov. 1.

On the tour the missions will inform American business men of the part they can take in the rehabilitation of Europe. Each mission will include five principals and a number of assistants and secretaries, making a party altogether of from 50 to 60. The Government departments at Washington are co-operating with the National Chamber in arranging for the missions' stay in the United States.

The plan of organization for the trade conference contemplates the appointment of a general committee of from 25 to 50 men. From this an executive committee will be selected to have directly in hand all arrangements for all details of conferences and the various visits to American cities. A. C. Bedford, chairman Standard Oil Co. of New Jersey, will act as chairman of both the general and executive committees. Other members of the executive committee thus far selected include: Homer L. Ferguson, Newport News Shipbuilding & Drydock Co. and president United States Chamber of Commerce; James A. Farrell, president United States Steel Corporation and chairman National Foreign Trade Council; George Ed. Smith, Royal Typewriter Co. and president American Manufacturers' Export Association, and E. G. Miner, president Pfaudler Co., Rochester.

The Italian mission will include Hon. Dr. Silvie Crespi, former food controller of Italy, and Comm. Pie Perons of G. Ansaldo & Co. In the Belgian mission is included Jean Delori, engineer and manager of the nail and wire works in Flanders. The French mission will probably be headed by Minister of Commerce Clementel.

Blast furnace lining material orders are reported by the Ashland Fire Brick Co., Ashland, Ky., for the Low Moor Iron Co., Low Moor, Va., the Interment Coal & Iron Corporation, Big Stone Gap, Va., and the By-Products Coke Corporation, Federal furnace plant, South Chicago.

Iron and Steel Markets

INCREASED OPERATION

Higher Prices on Some Products

Good Sales of Steel-Making Pig Iron—Europe's Situation Much Confused

Increasing operation of blast furnaces and steel plants is still the rule, and the tendency is rather emphasized in the Pittsburgh district. The Carnegie Steel Co. is now operating 46 out of 59 blast furnaces, having started up 15 in the past month. Its steel ingot capacity is now operating at 75 to 80 per cent.

What is notable throughout the industry is that unfilled orders are accumulating in a midsummer month often marked by slackening.

Higher prices have become effective in a few lines. Most of the mills have announced a \$5 per ton advance on all wire products for export, but in the case of Canada have confined the advance to wire rods, which are now \$57. Several independent sheet mills advanced black sheets \$2 per ton on July 28 and galvanized sheets \$4. Three other sheet mills are practically sold up for the year. On some automobile sheet sales for the first half of next year one or two mills realized \$5 per ton over to-day's prices. The sold-up condition of bar mills is emphasized, but prices stay where they were.

While some steel companies have sold about 150 per cent of their capacity in July, their bookings continue unbalanced, being less than capacity in plates, the larger size bars and in all railroad products. Meanwhile the inevitable day of railroad buying is nearer, with indications that on some products prices will be higher than at the time of the Railroad Administration's great refusal.

The activities of the labor unions have been most marked lately at Cleveland, Chicago and in western Pennsylvania outside of Pittsburgh. At Cleveland a strike on a steel works railroad for an actual 8-hour day with the same 11 hours pay now given for 10 hours work caused a partial shutting down of mills and a banking of furnaces. At Chicago the building trades lockout continues, but its early termination is expected.

A canvass of the actual returnings of common laborers to Europe shows some exaggeration of this factor. But the scarcity of skilled labor in metal-working shops in New England and some other districts continues.

At Chicago, car builders have placed 34,000 tons of plates, shapes and bars and are inquiring for 8000 tons more. For battleships 49 and 50 the Navy Department wants bids on 40,000 tons of the same three forms of material.

Structural projects include a dirigible hangar at Lakehurst, N. J., 6500 tons; the Allegheny River bridge at Pittsburgh 6000 tons, and the St. Johns River bridge in Florida 3600 tons. Contracts closed include 3000 tons for the Hanna Building at Cleveland, 5000 tons for Middletown, Ohio, rolling mill extensions and 1500 tons for a new car works at Niles, Ohio.

Our cable indicates but little advance out of the

chaotic conditions in British and Continental steel trades. The seven-hour day has cut down Welsh coal output and steel producers are further at sea over uncertainty as to costs. Some steel plants have closed down. Japan is buying Welsh tin plate freely. Belgian rods have sold at £17 5s f.o.b. Antwerp.

German works are greatly hampered by lack of raw materials and by rising labor costs. It is arranged that Sweden shall provide large quantities of ore in future, but the coal scarcity is marked and railroad facilities almost at the breaking point. Many rolling mills are down to a 25 per cent operation. Siemens-Halske and other electrical works have been closed by impossible demands of workers. For thin sheets the syndicate price of German mills is 900 marks per ton, but dealers have actually obtained 2000 marks. The steel syndicate is to liquidate and a new one will be formed, leaving out the Saar works, and some others.

Indicating the new proposals for German industry is the report that Krupps will manufacture locomotives and rolling stock on the basis that all profit over a fixed percentage goes to the state, while the company stands any losses.

Steel making iron, after a quiet period, has been active at Pittsburgh, recent sales amounting to 75,000 tons of basic, at \$25.75 at furnace, and 15,000 tons of Bessemer, at \$27.95. Steel works and foundries are melting more iron and the market still tends upward.

Sales of foundry iron reported in the East include nearly 6000 tons to a Connecticut jobbing foundry, 3000 tons to a railroad equipment company, and 10,000 tons to the Fairbanks Co., this last being for use in the first half of 1920. At Chicago a seller of foundry and malleable grades is asking \$2 above current prices for first quarter iron.

Coke ovens have resumed lately at a faster rate than blast furnaces and prices have eased off, furnace coke having been offered at \$3.85 at oven.

French steel works engineers are negotiating in this country for equipment to rebuild two plants there, the project involving an \$8,000,000 outlay. Electric furnaces are figuring in an important way in French and Belgian reconstruction plans.

Pittsburgh

PITTSBURGH, July 29.

As showing the increase in operations of blast furnaces and steel plants, we can state that at present the Carnegie Steel Co. is operating 46 out of 59 blast furnaces, and is also operating 75 to 80 per cent or more of its ingot capacity. Other large steel companies are increasing operations in about the same proportions, and recently the Jones & Laughlin Steel Co. and the National Tube Co. started up more blast furnaces, and will blow in others in the near future. The Carnegie company alone has started about 15 blast furnaces in the past month, and some stacks that are now being relined and repaired will be started as soon as ready.

The volume of new business in iron and steel is steadily growing, and operations among manufacturing plants are increasing daily. The heavy volume being taken in wire products, sheets and tin plate, and on

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	July 29, 1919	July 22, 1919	July 1, 1919	July 30, 1918
No. 2 X, Philadelphia....	\$29.00	\$29.10	\$29.00	\$34.40
No. 2, Valley furnace....	26.75	26.75	26.75	33.00
No. 2 Southern, Cin'ti....	28.35	28.35	28.35	36.60
No. 2, Birmingham, Ala....	26.75	26.75	24.75	33.00
No. 2, furnace, Chicago*	26.75	26.75	26.75	33.00
Basic, del'd, eastern Pa..	26.00	26.00	26.00	32.90
Basic, Valley furnace....	25.75	25.75	25.75	32.00
Bessemer, Pittsburgh....	29.35	29.35	29.35	36.60
Malleable Bess., Ch'go*	27.25	27.25	27.25	33.50
Malleable, Valley....	27.25	27.25	27.25	33.50
Gray forge, Pittsburgh....	27.15	27.15	27.15	33.40
L. S. charcoal, Chicago..	38.85	38.85	38.85	37.85

Rails, Billets, etc., Per Gross Ton:	July 29, 1919	July 22, 1919	July 1, 1919	July 30, 1918
Bess. rails, heavy, at mill	45.00	45.00	45.00	55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh..	38.50	38.50	38.50	47.50
O.-h. billets, Pittsburgh..	38.50	38.50	38.50	47.50
O.-h. sheet bars, P'gh....	42.00	42.00	42.00	51.00
Forging billets, base, P'gh.	51.00	51.00	51.00	60.00
O.-h. billets, Phila.	42.50	42.50	42.50	51.30
Wire rods, Pittsburgh....	52.00	52.00	52.00	57.00

Finished Iron and Steel,

Per Lb. to Large Buyers: Cents	Cents	Cents	Cents
Iron bars, Philadelphia....	2.745	2.595	2.595
Iron bars, Pittsburgh....	2.75	2.75	3.50
Iron bars, Chicago	2.62	2.50	3.50
Steel bars, Pittsburgh....	2.35	2.35	2.90
Steel bars, New York....	2.62	2.62	3.145
Tank plates, Pittsburgh..	2.65	2.65	3.25
Tank plates, New York....	2.92	2.92	3.495
Beams, etc., Pittsburgh..	2.45	2.45	3.00
Beams, etc., New York....	2.72	2.72	3.245
Skelp, grooved steel, P'gh.	2.45	2.45	2.90
Skelp, sheared steel, P'gh.	2.65	2.65	3.25
Steel hoops, Pittsburgh..	3.05	3.05	3.50

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire, Per Lb. to Large Buyers: Cents	July 29, 1919	July 22, 1919	July 1, 1919	July 30, 1918
Sheets, black, No. 28, P'gh.	4.35	4.35	4.35	5.00
Sheets, galv., No. 28, P'gh.	5.70	5.70	5.70	6.25
Wire nails, Pittsburgh....	3.25	3.25	3.25	3.50
Cut nails, Pittsburgh....	4.25	4.25	4.25	4.00
Fence wire, base, P'gh....	3.00	3.00	3.00	3.25
Barb wire, galv., P'gh....	4.10	4.10	4.10	4.35

Old Material, Per Gross Ton:

Carwheels, Chicago	\$25.00	\$24.00	\$22.50	\$29.00
Carwheels, Philadelphia..	24.00	23.00	23.00	29.00
Heavy steel scrap, P'gh..	21.00	20.50	18.50	29.00
Heavy steel scrap, Phila..	19.00	19.00	18.50	29.00
Heavy steel scrap, Ch'go.	21.00	19.50	17.50	29.00
No. 1 cast, Pittsburgh....	22.50	22.50	19.00	29.00
No. 1 cast, Philadelphia...	22.50	22.00	22.00	29.00
No. 1 cast, Ch'go, net ton.	24.00	22.00	22.00	28.25
No. 1 RR. wrot, Phila....	25.00	25.00	23.00	34.00
No. 1 RR. wrot, Ch'go, net	20.50	17.00	17.00	29.75

Coke, Connellsville, Per Net Ton at Oven:

Furnace coke, prompt ..	\$3.85	\$4.00	\$4.25	\$6.00
Furnace coke, future	4.12	4.12	4.12	6.00
Foundry coke, prompt....	5.00	5.00	5.00	7.00
Foundry coke, future.....	5.00	5.00	5.00	7.00

Metals,

Per Lb. to Large Buyers: Cents	Cents	Cents	Cents
Lake copper, New York....	23.75	23.75	19.25
Electrolytic copper, N. Y.	23.50	23.50	19.00
Spelter, St. Louis.....	7.80	8.00	7.10
Spelter, New York.....	8.15	8.35	7.45
Lead, St. Louis	5.75	5.50	5.15
Lead, New York	6.00	5.75	5.40
Tin, New York	70.00	70.00	70.50
Antimony, Asiatic, N. Y..	9.37 1/2	9.25	8.37 1/2
Tin plate, 100-lb. bx., P'gh.	\$7.00	\$7.00	\$7.00

some of the lighter lines is reflected in advances in prices. The Consolidated Steel Corporation announces \$5 price advances on wire products for export. Wire rods to Canada have also been raised \$5 per ton, or from \$52 to \$57, but there has been no advance in finished wire products for Canadian shipment, domestic prices effective from March 21 still being quoted.

Several independent sheet mills, effective from Monday, July 28, put up prices on black sheets \$2 and on galvanized sheets \$4 per ton, while three other mills are sold up for this year on all the sheets they can make and are practically out of the market. On some automobile sheet business taken for the first half of next year, several of the larger mills have secured an advance of \$5 per ton over to-day's prices. One leading maker of foundry iron is asking \$2 more a ton for delivery in the fourth quarter.

In the past two weeks sales in this district include fully 75,000 tons of basic iron and 15,000 tons or more of standard Bessemer iron, all at the regular prices. Three or four local furnace operators strongly predict that \$5 more will be obtained in the last quarter of this year. Steel works, foundries and other users of pig iron are melting more iron than at any time this year. There is some export inquiry for pig iron, but the domestic market is getting so active that most of the producers and dealers are not quoting on foreign business.

The labor situation outlook is serious. Elsewhere in this issue is printed a detailed account of the recently organized national committee for organizing iron and steel workers. Reports from blast furnaces and steel works in the Pittsburgh and Valley districts are that the developments among labor are being watched very closely. Next week there will be started a vote to determine on a general strike of iron and steel workers, and employers are viewing the matter with some concern. The men are going to make strong demands, most of which are certain to be refused. It is suggested that the active heads of some of the larger

steel companies are viewing the labor situation with more complacency than they should.

Pig Iron.—In the past two weeks 65,000 to 75,000 tons of basic iron, and 15,000 to 20,000 tons of Bessemer have been sold, all for delivery over remainder of this year. One local interest alone reports sales of basic and Bessemer amounting to close to 70,000 tons, and other sellers have also been active. A Mahoning Valley furnace interest has sold 6000 tons of basic per month for the last quarter, and another interest has sold probably 15,000 tons of basic, equal deliveries over remainder of the year, starting with August. These sales of Bessemer and basic are larger than have been reported at any one time in this market for some months, and there is still a good deal of inquiry. Foundry and malleable Bessemer iron are also fairly active, but a good many consumers are covered over the remainder of this year. Consumers are urging prompt shipments of iron, indicating that it is being melted about as fast as shipped. Two blast furnaces in the Shenango Valley now idle will be started late in August or early in September, one on Bessemer and the other on basic iron. There is no longer any talk of price shading; instead the trade here is looking for an advance early in the fall, perhaps before that time. One Shenango Valley consumer of basic expects to increase its consumption of iron 3000 tons in August and 4500 tons in September. The demand for ingot molds is getting heavier, and the leading maker at Sharpsville, Pa., will take out 50 per cent more iron in July than it did in May. Output of pig iron this month is certain to show a large increase over June. Prices are very firm.

Basic pig iron, \$25.75; Bessemer, \$27.95; gray forge, \$25.75; No. 2 foundry, \$26.75; No. 3 foundry, \$26.25, and malleable, \$27.25; all per gross ton at Valley furnaces, the freight rate for delivery in the Cleveland and Pittsburgh districts being \$1.40 per ton.

Billets and Sheet Bars.—There is a growing scarcity in the supply of sheet bars, and for the second time

in its history the American Sheet & Tinplate Co. is bringing sheet bars from Chicago to its mills in the Pittsburgh district, paying a freight rate of over \$4 a ton. The consumption of sheet bars at present is probably 50 per cent heavier than two months ago, and other sheet and tin plate mills are having trouble in getting delivery of bars as fast as needed. There is an active inquiry for forging billets, and sales are being made at the regular price of \$51, Pittsburgh, for delivery over the remainder of this year. It is estimated that the steel mills making billets and sheet bars in the Pittsburgh and Youngstown districts are now operating to close to 80 per cent of capacity and report that a scarcity in some kinds of steel mill labor has already developed and promises to become worse. Prices are very firm, and a very limited amount of steel is being offered in the open market.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at \$38.50, 2 x 2 in. billets at \$42; sheet bars, \$42; slabs, \$41, and forging billets, \$51 base, all f.o.b. at mill, Pittsburgh or Youngstown.

Ferroalloys.—There is quite an active inquiry for ferromanganese for delivery over the remainder of this year. Some steel mills that thought they had enough for the year are now again in the market. We note a fair inquiry for ferrosilicon, and some resale 50 per cent material is still being offered at \$80 to \$85 delivered. English 78 to 82 per cent ferromanganese is being offered at \$105, Baltimore, equal to about \$110, delivered in the Pittsburgh and Youngstown district, but domestic makers are meeting this price, so that no sales of the English alloy are being made in this market.

We quote 78 to 82 per cent domestic ferromanganese at \$110 delivered, with a reduction of about \$2 per unit for lower percentages. We quote 50 per cent ferrosilicon at \$80, and 18 to 22 per cent spiegeleisen at \$32 to \$35, delivered. Prices on Bessemer ferrosilicon are: 9 per cent, \$47.75; 40 per cent, \$49.75; 11 per cent, \$53.05; 12 per cent, \$56.35. We quote 6 per cent silvery iron, \$36.75; 7 per cent, \$38.50; 8 per cent, \$40.25; 9 per cent, \$42.25, and 10 per cent, \$44.75. About \$3 per gross ton advance is charged for each 1 per cent silicon for 11 per cent and over. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, which have a uniform freight rate of \$2.90 per gross ton for delivery in the Pittsburgh district.

Plates.—Some scattered inquiries for cars are coming out. The Ohio Central Railroad is in the market for 500 box cars, 500 flat cars and 50 narrow-gauge sugar cane cars. Railroads are doing more car repair work, as their equipment is wearing out fast and as a result mills report some increase in the demand for plates. An inquiry is in this market for 15,000 tons of ship plates for shipment to Japan. The mills are gradually increasing operations, and plate mills in this district are now operating at 60 to 75 per cent of capacity. It will, however, take a good deal more work before the plate mills will be able to operate at a normal rate. We quote 1/4-in. and heavier tank plate at 2.65c., Pittsburgh.

Structural Material.—A large amount of work is being figured on, but local fabricators say it is slow in being placed. The American Bridge Co. has taken about 6000 tons for the office building and theatre annex of the Hanna estate at Cleveland, 5000 tons for extensions and new buildings for the American Rolling Mill Co. at Middletown, Ohio, and about 1500 tons for new buildings for the new plant of the Youngstown Steel Car Co. at Niles, Ohio. The Jones & Laughlin Steel Co. has taken 250 tons for a warehouse for Rea & Co., in this city, and the Massillon Bridge Co., 600 tons for a store building for the Hess Snyder Co. at Massillon, Ohio. Bids have gone in on about 6000 tons for the new Baltimore & Ohio Third Street bridge in this city, and also on 3600 tons for the St. Johns River Bridge in Florida. Fabricators are slowly increasing operations at their plants, and are now running on an average of probably 75 per cent of capacity. We quote beams and channels up to 15 in. at 2.45c., Pittsburgh, and local fabricators say they are not able to buy plain steel under this price.

Sheets.—Effective from Monday, July 28, several independent sheet mills advanced prices \$2 per ton on black and \$4 on galvanized, and it is stated these ad-

vances, in prices may become general among all the independent sheet mills in a very short time. Three independent mills report they are sold up for remainder of this year, and are practically out of the market. Nearly all automobile builders have closed for their entire needs of automobile sheets over the remainder of this year, and several of the larger interests have covered their needs for the first half of 1920, paying the advance of \$5 per ton in this case. Two leading automobile builders have closed lately for upward of 100,000 tons of sheets, and are expected to buy more. This week the American Sheet & Tin Plate Co. is operating at 90 per cent of its hot sheet mill capacity, and independent mills are operating at about the same rate. The demand for electrical sheets is heavy, and one inquiry is for delivery over the rest of the year. Export demand is heavy, and one leading interest reports that it is booking close to 2000 tons per day of sheet and tin mill products for foreign shipment. Owing to the above noted conditions a general advance in prices of sheets in the near future seems probable. Prices on sheets effective from March 21 are given on page 335, but it should be noted that three or four leading independent mills are now quoting an advance of \$2 on black and \$4 on galvanized over these prices.

Tin Plate.—Demand is steadily getting heavier, and the mills are increasing their output as fast as the supply of steel and labor will permit. Some large consumers that made contracts some time ago underestimated their needs, and are now placing additional orders. The pressure on the mills for quick delivery of tin plate is strong, indicating that stocks of consumers are light. Heavy export demand is coming from Cuba, South America, India and the Orient, and the aggregate shipments are large. This week the American Sheet & Tin Plate Co. is operating at 96 per cent of hot tin mill capacity, and the independent mills are doing about as well. A shortage in supply of tin bars is looming up, and the American Sheet & Tin Plate Co. is bringing bars from Chicago to Pittsburgh the second time in its history. We quote production tin plate at \$7 per base box, and stock items at \$6.50 to \$6.75 f.o.b. Pittsburgh. The demand forterne plate is heavy, mills being sold up for two or three months. Prices onterne plate are given on page 335.

Iron and Steel Bars.—Mills rolling steel bars report an active demand, and are operating at 75 per cent, or better, of capacity. Implement makers are specifying freely against last half contracts. Prices of scrap are steadily going up, and there is some talk of an early advance in bar iron. The new demand for reinforcing steel bars is also more active, and prices are now holding firm.

We quote steel bars, rolled from billets, at 2.35c. and from old steel rails, 2.45c. Eastern mills are quoting iron bars for eastern shipment at 2.35c., while for western shipment 2.55c. Pittsburgh is quoted. Pittsburgh mills rolling iron bars quote at 2.75c., Pittsburgh, plus full freight rate to point of delivery.

Wire Rods.—Effective Monday, July 28, the Consolidated Steel Corporation made an advance of \$5 per ton on wire rods for export, including Canada. Both domestic and export inquiry is active. Canada is in the market at present for 5000 tons or more. Mills that usually have a fair quantity of surplus rods to sell in the open market now have very few, owing to the increased operations of their wire mills. Prices on rods to domestic consumers, as adopted on March 21 last, are given on page 335, but for Canada and export shipment are now \$5 per ton higher.

Wire Products.—Effective July 24, the Pittsburgh Steel Co. advanced its prices on wire \$2 per ton, and on wire nails \$5 per ton, making three concerns that have lately advanced prices to this extent, these being the Youngstown Sheet & Tube Co., the Cambria Steel Co. and the Pittsburgh Steel Co. The American Steel & Wire Co. has not made any price change, and we have not advanced prices on wire products, which are given on page 335. There has also been an advance of \$5 per ton, made by all the independent mills, on wire and wire nails through the Consolidated Steel Corporation for export shipment, save on wire products to

Canada, which have not been advanced. The market on wire products seems to be shaping itself for a general advance by the remainder of the mills. The domestic demand is heavy, and export business is active. Prices on wire products, as effective from March 21, are given, as stated, on page 335, but the three makers named are quoting an advance over these prices of \$2 per ton on wire and \$5 per ton on wire nails. Export prices on wire nails are now \$3.50, base, per keg; galvanized barbed wire, \$4.35; bright wire, \$3.25, and galvanized wire, \$3.95, all f.o.b. Pittsburgh.

Cotton Ties.—Very little new business is doing, consumers having covered their needs when the season opened. Cotton ties for July shipment on new orders are held at \$1.71½ per bundle of 45 lb., f.o.b. Pittsburgh.

Hoops and Bands.—Mills report the new demand is steadily getting heavier and two makers in this district are now operating their hoops and band mills at close to 100 per cent capacity, but state they have only a fair amount of orders ahead. We quote steel hoops and bands at 3.05c., Pittsburgh, plus usual extras.

Hot Rolled Strip Steel.—Demand is steadily getting heavier and mills now report they are operating at 75 to 85 per cent of capacity, consumers now being anxious to cover needs for remainder of this year, and at regular prices. We quote hot rolled strips at 3.05c. to 3.30c. per lb., f.o.b. Pittsburgh. The higher price being quoted by a few mills for hot rolled strips for deep stamping and drawing purposes.

Cold Rolled Strip Steel.—Mills are steadily increasing operations, consumers being anxious to cover their needs for remainder of this year, but a few mills are unwilling to sell for fourth quarter owing to the uncertainty as to prices of steel and labor.

Shafting and Screw Stock.—Makers are entering more orders than at any time in the past six months or more. The automobile trade is buying heavily and implement makers are specifying freely on contracts. Prices are reported holding firm, discounts being 28 per cent in carloads and 23 per cent in less than carloads, f.o.b. Pittsburgh.

Nuts and Bolts.—Makers report they are entering orders freely at the recent advance on nuts and bolts, jobbers and consumers being anxious to cover their needs over the remainder of this year. Local makers are now operating at close to 100 per cent of capacity, and report they have plenty orders ahead. Discounts now in effect on nuts and bolts are given on page 335.

Rivets.—Makers are operating to 75 per cent or better of capacity and report they are entering more new orders than at any time this year. We quote button head structural rivets at \$3.75 and cone head boiler rivets at \$3.80 per 100 lb., f.o.b. Pittsburgh.

Spikes.—For small spikes demand is active, and two local makers report they are sold up on these for several months ahead. Railroad spikes are quiet, railroads buying only such quantities as they need for repair work. Prices are reported as holding firm.

We quote standard spikes, 9/16 x 4½ in., and also small spikes, \$3.35 base per 100 lb. in carload lots of 200 kegs or more, plus usual extras. Boat and barge spikes, \$3.85 per 100 lb. in carload lots of 200 kegs or more.

Skelp.—Mills are sold up on all the material they can roll for the remainder of this year and have entered some business for delivery in first quarter of next year. We quote sheared steel skelp at 2.65c., universal at 2.55c. and grooved 2.45c. per lb., f.o.b. Pittsburgh.

Iron and Steel Pipe.—The mills are simply deluged with business in line pipe and oil well tubular goods, and are turning down a good deal more business than they are taking. Practically all the pipe mills are about filled up for remainder of this year, while a few mills that have some material for fourth quarter delivery are not anxious to sell heavily, believing the market

may be higher in the near future. So far none of the mills, aside from the Wheeling Steel & Iron Co., has advanced prices, but a general advance in the market on iron and steel pipe in a short time seems probable. Some mills in the first half of this month took more orders for line pipe and oil well tubular goods than they can turn out in two months. Some buying in these products has been done for first quarter of next year. Discounts on iron and steel pipe are given on page 335.

Boiler Tubes.—A fair amount of new business is being placed in boiler tubes, but the new demand for merchant tubes is very dull and prices are still being shaded. Discounts are given on page 335.

Coke.—There has been an excess in supply of prompt furnace coke in the past week, and prices have eased off to some extent, standard grades of blast furnace coke having been offered in the past few days as low as \$3.85 per net ton at oven. It is stated that coke producers have recently blown in ovens at a faster rate than the demand for furnace coke justified, which largely explains the weakness in prices. We now quote standard grades of 48-hr. furnace coke for prompt shipment at \$3.85 to \$4 and standard makes of 72-hr. foundry coke at \$5 to \$5.25, all per net ton at oven. Output of coke in the Upper and Lower Connellsville regions last week was 164,220 net tons, an increase over the previous week of about 6500 tons.

Old Material.—The scrap list of the Pennsylvania Railroad is out, bids to be in on Aug. 4, and awards to be made not later than Aug. 8. The main items included in the list are 4000 gross tons of old steel rails, 3000 gross tons of heavy melting steel, 275 gross tons of old carwheels and 1027 gross tons of railroad wrought scrap. The amount of scrap moving from dealers to consumers is still limited, the latter not being willing to pay the higher prices being quoted by the dealers. It is claimed that several large lots of heavy steel melting scrap have lately been sold at as high as \$21.50 delivered to consumers' mills. The new demand for borings and turnings is slightly better.

Heavy steel, melting, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered	\$21.00 to \$21.50
No. 1 cast, for steel plants	22.50 to 23.00
Re-rolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Franklin, Pa., and Pittsburgh....	20.00 to 21.00
Compressed steel	15.50 to 16.00
Bundled sheet, sides and ends, f.o.b. consumers' mills, Pittsburgh district	14.50 to 15.00
Bundled sheet stamping	13.00 to 13.50
No. 1 busheling	15.50 to 16.00
Railroad grate bars	16.00 to 17.00
Low phosphorus melting stock (bloom and billet ends, heavy plates) ¼ in. and heavier	24.00 to 25.00
Iron car axles	30.00 to 31.00
Locomotive axles, steel	30.00 to 31.00
Steel car axles	27.00 to 28.00
Railroad malleable	17.00 to 17.50
Machine shop turnings	13.00 to 13.50
Cast iron wheels	23.00 to 24.00
Rolled steel wheels	20.00 to 21.00
Sheet bar crop ends (at origin)....	20.00 to 20.50
Heavy steel axle turnings	14.50 to 15.00
Heavy breakable casts	20.50 to 21.00
Cast iron borings	14.00 to 14.50
No. 1 railroad wrought	20.50 to 21.00

The Pittsburgh Forge & Iron Co., Pittsburgh, has resumed operations at its bar, guide and puddling departments at its Woods Run plant, following a suspension of activities for about two weeks to allow for repair and improvement work. The departments give employment to about 250 men. The forge shop is still idle, but it is said that this department will resume operations at an early date.

The Cannonsburg Steel & Iron Works, Canonsburg, Pa., will add two hot sheet mills to its plant and expects to place the contract for them in a short time.

Four of the five blast furnaces of the National Tube Co. at Lorain, Ohio, are now in operation, the fourth stack having been started last week.

Chicago

CHICAGO, July 29.

The effort of the American Federation of Labor to take a strike vote among iron and steel mill workers is a source of considerable anxiety, but the movement is not generally regarded as likely to succeed. A committee of the Federation will convene here on Aug. 19, when it is believed the results of the vote will be known and will call a strike if it regards such a course as advisable. The lockout of the building trades in Chicago is still in force, but an early termination is looked for. Despite labor difficulties business continues to improve. The demand for plates has been given an impetus by a revival in car construction and repairs. Local car builders have placed orders for 34,000 tons of plates, shapes and bars and are inquiring for 8000 tons additional. Plate mills are beginning to accumulate substantial backlogs, and this is true to a greater extent of sheet and mild steel bar mills. An Eastern seller of soft steel bars is no longer accepting contracts and will book new orders only after they have been passed on by the mill. Structural business is also developing in good volume. Numerous export inquiries are current, but few orders are resulting therefrom, as concessions are generally asked for. While mills are glad to book foreign business, they are insisting on the full domestic price. Wire products and bolts and nuts continue active. A local producer of wire has raised its prices in conformance with the recent advances by Eastern independents, but the leading interest has not changed its quotations.

Steel mill operation is improving. The finishing mills at Gary are all in operation and two additional blast furnaces have been blown in at South Chicago. The leading interest is operating at about 70 per cent of capacity and the foremost independent continues on a 75 per cent basis. The hot weather and a shortage of skilled labor have impeded operations, particularly in the sheet mills. Tube mills are running full and are unable to keep pace with orders.

Foundry and malleable iron continue active, but producers of charcoal iron are practically out of the market for the remainder of the year. A Northern seller of foundry and malleable has taken some business for delivery in the first quarter of 1920 at \$2 a ton above the present quotations. Scrap continues to rise. While consumers are still cautious, they are purchasing more freely than at any time since the present advance commenced.

Pig Iron.—The leading seller of Northern iron is quoting both foundry and malleable for delivery in the first quarter of 1920 at \$2 above present prices, and has booked some business on that basis. The market continues rather active, despite the labor difficulties in the foundries. A producer with one furnace in operation has booked its capacity for the remainder of the year, and is contemplating blowing in another stack. Iroquois has blown in a second furnace in addition to the stack mentioned a week ago. Federal is blowing out one stack this week and lighting another which has been relined. A Michigan melter recently ordered 500 tons of malleable and a Wisconsin foundry is inquiring for a like tonnage of malleable. An inquiry for 500 tons of Bessemer is before the trade. A Southern interest has booked 500 tons of foundry for fourth quarter on the Birmingham base. Consumers of charcoal iron have covered freely for their last half requirements. At the present rate of operation charcoal furnaces are practically out of the market for the rest of the year. Maximum production has been unattainable, not only on account of labor difficulties, but because of forest fires, which have necessitated the use of every available man at times for fire fighting. An important charcoal producer is now operating at about two-thirds of capacity. Among recent orders for charcoal for last half delivery are two for 5000 tons each and a number of others ranging from 500 to 1200 tons. The Jackson County silvery furnaces are still down because of strike troubles. The Red River, Tenn., furnace will be fired in August. Because of the tie-up of sources of supply in this district, a Southern producer of silvery

has been taking considerable business f.o.b. Chattanooga. It has already sold out through September.

The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable and steel-making irons, including low phosphorus, which are f.o.b. furnace and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, average silicon, 1.50, second half delivery, f.o.b. furnace, average freight to Chicago \$2.50 (other grades subject to usual differentials)	\$29.25
Northern coke foundry, No. 1 silicon, 2.25 to 2.75	28.00
Northern coke foundry, No. 2 silicon, 1.75 to 2.25	26.75
Northern high-phosphorus foundry	26.75
Southern coke, No. 1 foundry and No. 1 soft silicon, 2.75 to 3.25	34.75
Southern coke, No. 2 foundry, silicon, 2.25 to 2.75	33.00
Southern foundry silicon, 1.75 to 2.25	31.75
Malleable, not over 2.25 silicon	27.25
Standard Bessemer	27.95
Basic	25.75
Low phosphorus (copper free)	40.00
Silvery, 7 per cent	42.05

Ferroalloys.—There is but little activity in any of the ferroalloys. Ferromanganese continues to be quoted at \$115, delivered, but spiegeleisen is firmer and has advanced to \$35, furnace. The price of ferrosilicon, 50 per cent, is unstable, but is in the neighborhood of \$80 delivered. The Canada Carbide Sales Co., Chicago and New York, is distributing a new product called ferrosilicon-aluminum, to be used for experimental purposes. The alloy contains 50 per cent silicon, 17 per cent aluminum, and about 33 per cent iron, together with traces of carbon, phosphorus and sulphur.

We quote 80 per cent ferromanganese at \$115, delivered; 50 per cent ferrosilicon, at \$80 delivered; spiegeleisen, 18 to 22 per cent, \$35, furnace.

Structural Material.—Statements in the press by representatives of the contractors and the unions indicate a more conciliatory disposition on the part of both and forecast an early termination of the lockout of the local building trades. While the labor difficulties here have had somewhat of a dampening influence on local structural activity, the aggregate business received by the mills continues to increase steadily. The largest structural order recently placed calls for 1454 tons to be used in the construction of the first section of the Chicago Tribune building to be erected at Austin Avenue and St. Claire Street, Chicago. This tonnage will be rolled and fabricated by the Bethlehem Steel Co. Among the structures in contemplation is the Medical Building, eighteen stories, 100 x 125 ft., to be erected at Omaha, Neb. The plans, which are being drawn by Thomas R. Kimball, of that city, are expected to be completed by Sept. 1. Vogelsang's, West Madison Street, Chicago, Restaurant, was closed last week and will be torn down to provide room for the new Blackhawk Hotel, which will require between 2500 and 3000 tons of steel. New inquiries include:

Beach Department Store, Joliet, Ill., 300 tons.
Bank, Butler, Pa., 60 tons, on which bids are being taken by the Weary & Alford Co., Chicago.
Grand Leader Store, St. Louis, 1100 tons.
J. D. Adams, warehouse, Indianapolis, 200 tons.

Additional recent awards include:

Chicago & Northwestern Railroad, grain elevator, South Chicago, Ill., 298 tons, to Toledo Bridge & Crane Co.
George B. Lambert & Co., alterations and additions to machine shop, East Chicago, Ind., 178 tons, to Midland Structural Steel Co.
International Shoe Co., shoe factory, Mount Vernon, Ill., 150 tons, to Christopher & Simpson Iron Works.
Advance Rumely Co., additions to machine shop, Laporte, Ind., 100 tons, to American Bridge Co.
Gormully & Jeffery Co., power house, Indianapolis, Ind., 500 tons, to Rochester Bridge Co., Rochester, Ind.
Hubbard Steel Foundry Co., plant, East Chicago, Ind., 50 tons, to Northwestern Bridge & Iron Co.

Bars.—The only bar-iron mill in this district which has been quoting at 2.50c., Chicago, has now advanced to 2.62c., or 2.35c., Pittsburgh, the price which other mills have been quoting for several weeks. Further advances are looked for in view of the uninterrupted advance in scrap. Although still dull, bar iron is more active than it has been since the first of the year. The

railroads are commencing to feel the market, among recent inquiries from this source being two aggregating 3000 tons. The demand for mild steel bars continues good. An Eastern seller in this district is no longer taking contracts and will book new orders only after they have been passed on by the mill. Mills are running full, some of them with two and three months' work ahead. Rail carbon business is steadily improving, but some mills are experiencing difficulty in securing old rails at prices which will enable them to make a profit. The hard steel mill of the leading independent is now on double turn, with sufficient business booked and in prospect to keep it running on that basis the remainder of the year.

Mill prices are: Mild steel bars, 2.35c. Pittsburgh, taking a freight rate of 27c. per 100 lb.; common bar iron, 2.62c.; Chicago; rail carbon, 2.45c. mill. Jobbers quote 3.37c. for steel bars out of warehouse.

Plates.—The demand is better than at any time since the first of the year. The improvement in business is due in part to a revival in car construction and repairs. One local car builder has purchased 11,000 tons of plates, shapes and bars, and another has placed 8000 tons to be used on car repairs, both lots having been ordered from the leading interest. A Chicago builder of tank cars has placed 15,000 tons of plates and shapes to be used on new car construction, the tonnage having been divided between different mills. Current inquiries from local car builders include lots of 3000 and 5000 tons, the material in both cases being required for repair work. The flotation of a \$30,000,000 loan in this country to be used for the rehabilitation of Chilean railroads is expected to result in the placing of orders for rolling stock. An inquiry by the Chilean Government for 600 freight cars has been current for some time, but has not yet been closed. In addition to the demand from car builders, a good volume of business in plates is coming from the oil fields and from miscellaneous manufacturers. The mills have considerable work ahead. The leading independent, in fact, is losing tonnage because it cannot deliver earlier than September. The Havana Central Railroad, Cuba, is inquiring for 8 first-class and 12 third-class passenger coaches.

The mill quotation is 2.65c., Pittsburgh, the freight to Chicago being 27c. per 100 lb. Jobbers quote 3.67c. for plates out of stock.

Sheets.—Prompt delivery is difficult to obtain, as the mills have several months' work ahead. One local interest can deliver heavy sheets in jobbing sizes in October, but cannot insure delivery on lighter sheets until December. Mill operation is impeded by the hot weather and a scarcity of skilled labor. A mill in the St. Louis district is down on account of a strike.

Mill quotations are 4.35c. for No. 28 black, 3.55c. for No. 10 blue annealed, and 5.70 for No. 28 galvanized. Jobbers quote Chicago delivery out of stock: No. 10 blue annealed, 4.57c.; No. 28 black, 5.62c., and No. 28 galvanized 6.97c.

Wire Products.—A local mill has raised its prices in conformance with the recent advances of Eastern mills, but the leading interest has not changed its quotations. The latter has booked an equivalent of its capacity for three to four months ahead. The demand for nails is very strong. For mill prices see finished iron and steel f.o.b. Pittsburgh, page 335.

Rails and Track Supplies.—The railroads are ordering track supplies in small lots to meet pressing requirements, but the demand is by no means large. The two local producers of iron tie plates have advanced their prices to 2.90c. mill.

Standard railroad spikes, 3.35c. Pittsburgh. Track bolts with square nuts, 4.35c. Pittsburgh. Steel tie plates and iron angle bars, 2.75c. Pittsburgh and Chicago; tie plates, iron, 2.90c. f.o.b. makers' mills. Light rails, 2.45c. f.o.b. makers' mills, with usual extras.

Bolts and Nuts.—Specifications are heavy, particularly from jobbers. Agricultural implement manufacturers are expected to enter the market soon to cover their fall requirements and if the railroads enter the market also the demand will greatly exceed the ca-

capacity of manufacturers. One important mill in this district is already practically out of the market as the result of the receipt of orders at the rate of twice its output. Despite the large volume of business booked, maximum production is difficult to attain on account of a growing shortage of labor. One maker is now enforcing its monthly specification clause under which it can cancel a month's deliveries if specifications are not received before the end of the month. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 335. Jobbers quote:

Structural rivets, 4.72c.; boiler rivets, 4.82c.; machine bolts up to $\frac{3}{8}$ x 4 in., 50 and 10 per cent off; larger sizes, 40 and 10 off; carriage bolts up to $\frac{3}{8}$ x 6 in., 50 and 5 off; larger sizes, 40 off; hot pressed nuts, square tapped and hexagon tapped, \$2 off; coach or lag screws, gimlet points, square heads, 50 and 10 per cent off. Quantity extras for nuts are cancelled.

Cast Iron Pipe.—The recent advances have not impeded buying. Large pipe continues rather dull and the smaller sizes active. Recent awards include:

Denver, Colo., 1800 tons, 36-in. and 24-in., to the United States Cast Iron Pipe & Foundry Co.

Denver, Colo., 1000 tons, 6 to 20-in., to Colorado Fuel & Iron Co.

Lakewood, Ohio, 250 tons to United States Cast Iron Pipe & Foundry Co.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., \$56.30; 6-in. and larger, \$53.80; class A and gas pipe, \$1 extra.

Old Material.—Users are buying more heavily than at any time since the present advance in prices commenced. They are still cautious in covering their requirements, however. Among recent purchases by consumers were 2000 tons of heavy melting steel bought at \$21.50 per gross ton, 1000 tons of No. 1 cast, purchased at \$25 per net ton, and 2000 tons of rolling mill grades. A representative of a large Eastern consumer of stove plate canvassed the Chicago market last week, but was able to purchase only three carloads, for which he paid \$21.50 per net ton. Stove plate and agricultural malleable are scarce and the supply of rolling mill grades is short of the demand. Railroad offerings this week include a blind list issued by the Lake Erie & Western, 500 tons offered by the St. Paul, and three cars by the Chicago & Western Indiana. Sixty-four shell-turning lathes were offered by the Ordnance Department last week, but the highest bid, \$23 per net ton, was rejected, and tenders will be asked again. Fifteen thousand tons of shell forging billets were sold by the Ordnance Department yesterday, the tonnage having been equally divided between two dealers and one consumer. The prices paid were \$24.88, \$24.76 and \$24.67 per gross ton, respectively.

Per Gross Ton

We quote delivery in buyers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Iron rails	\$25.00 to \$26.00
Relaying rails	35.00 to 45.00
Car wheels	25.00 to 26.00
Steel rails, rerolling	29.00 to 30.00
Steel rails, less than 3 ft.	24.50 to 25.00
Heavy melting steel	21.00 to 22.00
Frogs, switches and guards cut apart	21.00 to 22.00
Shoveling steel	21.00 to 21.50

Per Net Ton

Iron angles and splice bars	\$24.00 to \$25.00
Steel angle bars	21.00 to 21.50
Iron arch bars and transoms	26.00 to 27.00
Iron car axles	29.50 to 30.50
Steel car axles	27.50 to 28.00
No. 1 busheling	18.00 to 18.50
No. 2 busheling	13.50 to 14.00
Cut forge	19.50 to 20.00
Pipes and flues	16.75 to 17.25
No. 1 railroad wrought	20.50 to 21.50
No. 2 railroad wrought	19.50 to 20.00
Steel knuckles and couplers	20.50 to 21.00
Coil springs	22.00 to 22.50
No. 1 cast	24.00 to 25.00
Boiler punchings	22.50 to 23.00
Locomotive tires, smooth	22.50 to 23.00
Machine shop turnings	9.50 to 10.00
Cast borings	11.75 to 12.75
Stove plate and light cast	21.50 to 23.50
Grate bars	19.50 to 20.00
Brake shoes	20.00 to 21.00
Railroad malleable	20.00 to 21.00
Agricultural malleable	20.50 to 21.00
Country mixed	16.00 to 17.00

Philadelphia

PHILADELPHIA, July 29.

Improvements in the demand for steel products continues, but the Philadelphia district is noticeably lagging behind other steel-consuming districts. Much of the business that is coming to Eastern steel plants originates in the Central West and in the New York and New England territories.

Demand is principally for bars, wire products, pipe, cold-rolled and cold-drawn steel, spikes, light rails and sheets. The demand for structural shapes is improving and there is some betterment in plates, though plates are the weakest spot in the steel situation. Some Eastern plate mills are running at about 50 per cent of capacity, with practically no business coming from shipyards and car and locomotive builders. If these consumers should come into the market actively a decidedly different condition would soon exist.

One large steel interest is virtually sold up on bars for the remainder of the year, while a western Pennsylvania mill is in almost the same condition and will make no bar contracts for this year. A Buffalo mill is quoting September-October delivery on bars. Implement makers and jobbers are specifying freely. Makers of wire products in the Pittsburgh-Youngstown district have advanced prices 25c. per 100 lb. on nails and 10c. per 100 lb. on other wire products, while the leading export interest has advanced all export prices on wire products and another export company, representing independent steel interests, has taken similar action. An Atlanta, Ga., maker of wire products has increased all prices \$5 a ton.

Some consumers, particularly in the automobile trade, have been making contracts for the first half of 1920, subject to price revision on Jan. 1, 1920, their object being to protect themselves on delivery rather than on prices. Several steel companies have notified their sales agents to make no contracts for the remainder of 1919.

The pig-iron market is not active, but a satisfactory business is being done for mid-summer. Some furnacemen, however, complain that buying in the Philadelphia district is on a much smaller scale than in other consuming districts. Sales of about 4000 tons of basic have been made by two or three makers at prices equivalent to \$26.60 and \$27.10, Philadelphia, and standard low phosphorus has been bought by the same consumer at \$35, furnace. The scrap market tends toward higher prices, based largely on activity in the Pittsburgh district, where heavy melting steel has sold up to \$22.50, delivered.

Ore.—Manganese ore continues to arrive from Brazil on old contracts, a shipment of 1750 tons, with a declared valuation of \$74,001, having been received at this port last week.

Pig Iron.—Higher prices for basic pig iron have been paid on recent sales. A Trenton, N. J., wire manufacturer bought about 4000 tons from two or three makers, the prices paid being equivalent to \$26.60 and \$27.10, Philadelphia. The same consumer also bought standard low phosphorus iron at \$35, furnace. Demand for foundry iron is not active, but a fair business for mid-summer is being done. No. 2 X iron is quoted by one seller at \$29.60, Philadelphia. A Lehigh Valley interest, which has been selling at \$28, furnace, or \$29.10, Philadelphia, has advanced its price 50c. a ton. Some other makers are asking and getting still higher prices. A 20,000-ton inquiry from a Vermont scale manufacturing plant has been quoted on in this district, but the order, it is believed, is not likely to come here on account of the high freight rate. The prospective buyer has offered to pay cash for the iron, leaving it on furnace bank for delivery in the first half of 1920. The Crane Co., Bridgeport, Conn., which inquired for 5000 tons of foundry iron, did not place its order in this district. Virtually all of the Virginia makers of foundry iron have withdrawn from the market or are quoting prices so high that probably little of their iron will come into this market. Some are asking \$30, furnace, and the leading interest has advanced its price to \$31, furnace, for any grade. One

seller in withdrawing from the market states that prospective increases in the cost of fuel make it impossible at this time to forecast what pig-iron production costs will be a few months hence. A feeling that pig iron will be scarce this fall and that prices will go higher is also a factor in the bullish attitude of some Virginia furnacemen. A 500-ton lot of gray forge iron was sold last week at a price equivalent to \$26.60, Philadelphia, and this appears to be the minimum. A new factor in the market is the appearance of several inquiries for round lots of basic and foundry iron for speculative purposes. Not much attention has been paid to these inquiries. We quote standard grades of iron for delivery in Philadelphia or vicinity as follows, except that low phosphorus grades are quoted f.o.b. furnace. Prices quoted on Virginia iron are those at which last reported sales were made, but probably cannot now be duplicated.

Eastern Penna. No. 2 X, 2.25 to 2.75 sil.	\$29.60 to \$31.60
Eastern Penna. No. 2 plain, 1.75 to 2.25 sil.	28.60 to 30.60
Virginia No. 2 X, 2.25 to 2.75 sil. (nominal) ..	30.60
Virginia No. 2 plain, 1.75 to 2.25 sil. (nominal) ..	30.60
Basic	26.60 to 27.10
Gray forge	26.60
Malleable	28.35
Standard low phosphorus (f.o.b. furnace) ..	35.00
Copper bearing low phosphorus (f.o.b. furnace) ..	35.00

Ferroalloys.—Sales of domestic ferromanganese, 78 to 82 per cent, have been made at \$110, delivered, in competition with the new quotation of \$105, seaboard, for British ferromanganese. Some makers are quoting \$115, but this is not generally being obtained. Low-grade spiegeleisen has been sold at sacrifice prices, but the standard grade, 18 to 22 per cent, is fairly firm at \$32 to \$35, furnace.

Semi-Finished Steel.—Demand for semi-finished steel is not especially active in this market, but some business in small lots is being done. An Eastern steel company declined to quote on 3000 tons of rerolling billets, as it now needs all of its steel for its own plants. The same company has withdrawn from the market on sheet bars. We quote \$42.50 on 4 x 4-in. open-hearth rerolling billets, \$55 for forging billets and \$45 for slabs, all delivered Philadelphia.

Plates.—Some of the Eastern plate mills are now operating at from 40 to 50 per cent, which is an improvement over recent weeks. There is very little buying by shipbuilders and car and locomotive builders, and if these consumers were to come in the market actively the plate situation would soon show up in a decidedly different light. The Pennsylvania Railroad is reported to have bought about 2000 tons of plates for car repairs. There are still reports of occasional concessions on plates, but a majority of sellers are holding firmly to the 2.65c. base price. We quote sheared plates, ¼ in. and heavier, at 2.895c., Philadelphia.

Structural Material.—One of the largest prospective structural jobs which may soon come into the market is the new 32-story Fidelity Trust Building, plans for which are now in the hands of the architects. Building activity in Philadelphia and vicinity has not yet assumed sizable proportions. A good deal of the business in shapes coming to Eastern mills originates in other territories. One company last week sold, all told, a quantity of shapes equal to its weekly output, which was its best week this year for this product. Prices are said to be firmly held on the basis of 2.695c. Philadelphia.

Bars.—One of the largest interests is reported to be sold up on bars for the remainder of the year. Another company has so much business that it has temporarily withdrawn from the market, and at present will make no commitments over the remainder of the year. Implement makers in the Central West and the jobbing trade are specifying freely. All makers of bar iron in this district have advanced prices \$3 a ton to 2.50c., Pittsburgh, or 2.745c., Philadelphia. Double refined bar iron is 1c. per lb. higher. The price of steel bars remains firm at 2.595c., Philadelphia. De-

liveries are getting further off. A Buffalo mill is now quoting September-October shipment.

Sheets.—An Ohio maker of sheets has withdrawn from the market, having sold as far ahead as it cares to for the present. The demand for sheets in this district is not especially large, but the business taken in other markets has filled up several of the mills quite comfortably. We quote Philadelphia delivered prices on sheets as follows: No. 10 blue annealed, 3.795c.; No. 28 black, 4.595c., and No. 28 galvanized, 5.945c.

Old Material.—Increasing strength has been imparted to the local scrap market by reports from the Pittsburgh district of high prices paid there. One sale of heavy melting steel at \$22.50, delivered, is reported and there have been others at prices only 50c. or \$1 under this price. An Eastern steel plant will pay only \$19, but is having difficulty in getting steel, while a Delaware plant has been forced to pay \$19.50, and offerings are not freely made at that price. A local steel company has reinstated orders which were suspended at the time the armistice was signed, and dealers or brokers who have these orders have offered \$20. Carwheels are 50c. to \$1 a ton higher and hard to find. For stove plate a New Jersey consumer has paid up to \$21, delivered. A Cumberland, Md., plant has paid \$23 for rerolling rails. We quote for delivery at consumers' works, eastern Pennsylvania, as follows:

No. 1 heavy melting steel.....	\$19.00 to \$20.00
Steel rails, rerolling	22.00 to 23.00
No. 1 low phosphorus, heavy, 0.04 and under	23.00 to 24.00
Carwheels	24.00 to 25.00
No. 1 railroad wrought.....	25.00 to 26.00
No. 1 yard wrought.....	22.00 to 23.00
No. 1 forge fire	15.00 to 15.50
Bundled skeleton	15.00 to 15.50
No. 1 busheling	16.00 to 17.00
No. 2 busheling	13.00 to 14.00
Turnings (short shoveling grade for blast furnace use)	12.50 to 13.00
Mixed borings and turnings (for blast furnace use)	12.50 to 13.00
Machine-shop turnings (for rolling mill and steel works use)	14.50 to 15.00
Heavy axle turnings (or equivalent)	15.00 to 16.00
Cast borings (clean)	14.50 to 15.00
No. 1 cast	22.50 to 23.50
Grate bars	20.00 to 21.00
Stove plate	20.00 to 21.00
Railroad malleable	20.00 to 21.00
Wrought iron and soft steel pipes and tubes (new specifications).....	19.50 to 20.00
Ungraded pipe	14.00 to 15.00

Birmingham

BIRMINGHAM, ALA., July 28.

Pig Iron.—The feature has been the revival of buying in the Middle West with free acceptance of the silicon differentials and without freight rate absorption by the furnace interests. The Chicago territory took around 2000 tons of 2.75 to 3.25 silicon, which also bore 1 per cent manganese, at \$30.75, an allowance of \$1 premium being made for the manganese content in addition to the high silicon differential. Lots ranging from carloads and 100 tons to 700 tons have been sold in the Indiana, Ohio, Illinois and St. Louis territories, and a considerable amount of business is being booked day by day. Only one interest fails to sell on the silicon differentials, but, of course, does not guarantee silicon content, sales being by fracture. For instance, this interest sold a small tonnage of No. 1 at \$27.75. However, it recognizes the basis of \$26.75 for silicon 1.75 to 2.25. The inquiry continues to be quite brisk and all interests look for a still stronger market. The Alabama Co. is preparing to blow in another stack at Gadsden, giving it two on the active list. The Gulf States Steel Co. has resumed in all departments at what is understood to be a 60 per cent rate of operation. No. 1920 business has been booked. All but one interest are fairly well taken care of for the remainder of the year. One interest has only high silicon to dispose of. Both Woodstock, at Anniston, and the Sheffield Iron Corporation, Sheffield, remain down, no immediate preparations to resume having been made. In order to offset the growing outgo of negro labor from the Birmingham district to northern points at solicitation of foreign labor agents the Alabama Assembly has enacted

a law fixing an annual license of \$2,500 for such agents and exacting a \$5,000 bond against false representations. There is already a common and expert labor shortage that may become a menace as operations are sought to be increased. We quote per gross ton, f.o.b. Birmingham district furnaces, as follows:

Foundry, silicon 1.75 to 2.25.....	\$26.75
Basic	25.75

Cast Iron Pipe.—The leading pipe interest, in addition to doing a good business in fittings, has satisfactory orders coming in regularly for gas and water pipe from southern municipalities. Sanitary pipe shops ship as fast as they manufacture to an eager trade. The prospects in all pipe lines are excellent.

Coal and Coke.—Alabama coal operators admit the loss of 2,000,000 tons of coal to Tennessee and Kentucky this year on competitive bidding. The steam coal trade still lags, and the domestic is not over brisk. The General Assembly is debating a tax of 5 cents on coal and one of 3 cents on ore and a compromise which will result in reducing the rate is rather expected. Good foundry coke is bringing \$9 and has a demand greater than the output.

Old Material.—There appears to have been no change in the scrap market so far as heavy steel is concerned, consumers declining to pay more than \$15, while dealers hold for several dollars more. A show-down is probable at no distant date when steel stocks are low. Wrought is also dull. Nothing further has been done in the plan of moving a lot of heavy steel to Mediterranean points, via New Orleans. We quote per gross ton, f.o.b. Birmingham district dealers' yards, prices to consumers, as follows:

Steel rails	\$14.50 to \$15.00
No. 1 heavy steel	14.00 to 14.50
Cast iron borings	8.00 to 8.50
Machine-shop turnings	8.00 to 8.50
Stove plate	17.00 to 18.00
No. 1 cast	22.00 to 22.50
Car wheels	22.00 to 22.50
Tramcar wheels	21.50 to 22.00
Steel axles	22.00 to 23.00
No. 1 wrought	14.00 to 15.00

Buffalo

BUFFALO, N. Y., July 28.

Pig Iron.—Inquiry in the past week has shown considerable increase over the preceding week and furnace-men believe that some of the tonnage asked for is for speculative purposes. They are not inclined to look with favor upon such propositions. Inquiry for all grades probably aggregated 50,000 tons and quite large tonnages are reported placed. Bookings probably reached 25,000 tons or more. One interest has increased its price on the malleable grade to \$28 at furnace, and has made sales at this level. Further price advances in grades that are well sold up seem imminent. Furnaces are declining to quote on 1920 business on account of the possibility of higher costs. With 1919 capacity very nearly all taken and two of the producing interests of the district already out of the market for the remainder of the year, and with inquiry increasing, the market has arrived at a very satisfactory status from the producer's point of view. We quote as follows, f.o.b. furnace, Buffalo:

No. 1 foundry, 2.75 to 3.25 silicon	\$29.75
No. 2 X, 2.25 to 2.75 silicon.....	28.00
No. 2 plain foundry, 1.75 to 2.25 silicon	\$26.25 to 27.00
Gray forge	25.75 to 26.00
Malleable, silicon not over 2.25.....	27.25
Basic	25.75
Basic, 1 to 1½ per cent manganese.....	26.25
Basic, 1½ to 2½ per cent manganese.....	26.75
Bessemer	27.95
Lake Superior charcoal, regular grades, f.o.b. Buffalo	32.35

Finished Iron and Steel.—The situation in finished products is daily growing stronger. Specifications are coming in freely against bar and structural contracts, and orders for tin plate have increased to such an extent, sellers state, that mills that have been selling tin mill sizes of black plate have withdrawn from the market and are reserving the balance of their capacity for the tinned product. While it is understood that all wire makers have advanced prices, such inde-

pendents as have not made the announcement have withdrawn from the market. It is believed the leading interest has advanced its prices on wire rods for shipment into Canada \$5 per ton, which advance has been followed by the independents. It is understood that one independent bar producer has already advanced prices 5c. per 100 lb. If the demand continues during August as it has during July, it is agreed there will be further material advances on all steel products due to the advancing costs, and this tendency will be accentuated if freight rates advance. The Lackawanna Bridge Co. will erect a foundry building for the Continental Motors Co. at Muskegon, Mich., requiring 150 tons.

Prices f.o.b. Buffalo are as follows: Steel bars, 3.40½c.; iron bars, 4.10½c.; shapes, 3.50½c.; plates, 3.70½c.; No. 10 blue annealed sheets, 4.60½c.; No. 28 black, 5.65½c.; No. 28 galvanized sheets, 7.00½c. For "store door delivery" add 0.04½c. to each commodity.

Old Material.—The market continues to show a strengthening tendency and an enlarging local demand for most all commodities. Local buying of heavy melting steel is commencing to assume considerable proportions. The aggregate of tonnage purchased last week was larger than for a long period, but dealers are still disinclined to dispose of the stocks of heavy melting steel they have on hand at the prices offered to-day. The schedule price has been advanced \$1 to \$1.50 per ton over prices current last week. No. 1 railroad wrought and iron and steel axles have advanced \$2 per ton; low phosphorus, wrought pipe and bundled sheet stamping, \$1, and locomotive grate bars, \$1 to \$1.50 per ton. Machine shop turnings are now selling at \$12 to \$12.50; iron rails, \$24 to \$25, and No. 1 busheling scrap at \$16.50 to \$17. We quote dealers asking prices as follows, f.o.b. Buffalo:

Heavy melting steel, regular grades...	\$18.00 to \$18.50
Low phosphorus, 0.04 and under.....	22.00 to 23.00
No. 1 railroad wrought	21.00 to 22.00
No. 1 machinery cast	22.50 to 23.00
Iron axles	26.00 to 27.00
Steel axles	26.00 to 27.00
Carwheels	22.50 to 23.50
Railroad malleable	19.00 to 20.00
Machine-shop turnings	10.00 to 12.00
Heavy axle turnings	15.00 to 16.00
Clean cast borings	13.00 to 14.00
Iron rails	23.00 to 24.00
Locomotive grate bars	19.00 to 20.00
Stove plate	21.00 to 22.00
Wrought pipe	16.00 to 17.00
No. 1 busheling	15.00 to 16.00
Bundled sheet stamping	13.00 to 14.00

New York

NEW YORK, July 29.

Pig Iron.—An improved demand for foundry iron is noted as compared with the first two or three weeks of July. Several sales of round lots of foundry iron have been made, including 3000 tons to the American Brake Shoe & Foundry Co.; 1500 tons to the New York Central Railroad; 5000 to 6000 tons of 2X to the Sessions Foundry Co., Bristol, Conn., and 10,000 tons to the Fairbanks Co. The latter company may buy about 15,000 tons more and will permit the iron to remain on furnace banks until the first half of 1920, when it will be shipped to plants of this and affiliated companies. The Worthington Pump & Machinery Corporation is inquiring for 3600 tons of No. 2 plain iron for the last five months of this year and about 3800 tons of the same grade for the first half of 1920. An Auburn, N. Y., consumer wants 1000 tons for delivery over the remainder of the year, and there are a number of other smaller inquiries in the market. Of the about 5000 tons sold to the Crane Co., Bridgeport, Conn., there was 1000 tons of malleable. A large lot of iron is reported to have been sold at \$27.50, eastern Pennsylvania, for No. 2 X, and another sale is reported on the base of \$28, furnace, with a freight rate of \$1.50, for the same grade of iron. As a general rule there is less tendency to shade prices, and some eastern Pennsylvania furnaces are holding for as high as \$30, furnace, for No. 2 X. Virginia makers are either out of the market or are quoting prices too high to attract

much business. Practically no Southern iron is coming to this market because of the high prices quoted by Southern producers, the \$7 freight rate making the delivered price almost prohibitive. English inquiries for basic iron continue to command some attention, but the unfavorable exchange rate and other factors make it almost impossible to close such business. One New York seller reports several export sales last week aggregating about 3600 tons. We quote as follows, delivered New York, for Northern and Southern grades, prices on the latter being nominal, as are also the prices on Virginia iron:

No. 1 foundry, silicon, 2.75 to 3.25...	\$30.80 to \$31.30
No. 2 X, silicon, 2.25 to 2.75.....	30.30 to 30.80
No. 2 plain, silicon, 1.75 to 2.25.....	29.80 to 30.30
No. 2 X, Virginia, silicon, 2.25 to 2.75.	31.40 to 31.90
No. 1 Southern, silicon, 2.75 to 3.25.....	32.45
No. 2 Southern, soft (all rail), sil., 2.25 to 2.75	30.70
No. 2 Southern (all rail), sil., 1.75 to 2.25....	29.45

Ferroalloys.—Demand for ferromanganese is very light and consists of spasmodic inquiries and sales of 100-ton and carload lots for early delivery. Domestic producers are generally still quoting \$115 delivered, but it is believed that \$110 can be easily done on desirable business. The quotation of the British producers is unchanged at \$105, seaboard. The spiegeleisen market is quiet but firm at \$35, furnace, for early delivery. It is reported but not confirmed that a sale of 500 tons was made in the last week under this level. Ferro-silicon, 50 per cent, is strong at \$80 per ton delivered.

Finished Iron and Steel.—The Navy Department has issued requests for bids on approximately 40,000 tons of steel plates, bars and shapes for use in the construction of battleships 49 and 50 at the Brooklyn Navy Yard. Requests specify that the bidders should submit "the net price f.o.b. mill," as well as "basing price f.o.b. mill" requested in previous bids. The department also asks that the bids specify transportation charges from the mill to the New York yard, together with complete data as to extras which it is proposed to charge as far as this can be detailed from the information contained in the departmental specifications. The first delivery of 5000 tons under the contract is to be made in September, and 5000 a month thereafter until the contract has been filled. The Bureau of Yards and Docks, Navy Department, has announced it will receive bids up to Aug. 6 on about 6500 tons of fabricated steel for a dirigible hangar at Lakehurst, N. J. The Allegheny River bridge at Pittsburgh, about 6000 tons, is up for bids, and other projects in the market include 250 tons for a warehouse at Curtis Bay, Md., near Baltimore; 700 tons for a shop building at Schenectady, N. Y., for the American Locomotive Co.; 700 tons for a bank building at Flint, Mich.; 600 tons for a service station in New York for the Kelly-Springfield Tire Co., and 400 tons for a bridge for the Baltimore & Ohio Railroad. The Communipaw Steel Co. will fabricate 500 tons for repairs to pier sheds in Brooklyn. The Eastern Bridge & Structural Co. has received an order for 300 tons for alterations at the Watervliet Arsenal, Watervliet, N. Y. Not much business has been done in plates, most of the lots under negotiation for export account still being held up. The New York shipyards are not securing new ship contracts very rapidly, but a few have asked for tenders on definite lots of plates for ships, the latest being one that will involve about 1000 tons of plates and shapes. The plate market is resisting efforts to get better than 2.65c., and a number of cases are learned of where, particularly on export business, closures finally had to be made at the prevailing level. One of the large local fabricators likewise paid 2.65c. for a contract for 500 tons. Car-builders have no light on the development of general railroad buying, though they report increasing complaints of car shortage. The General American Tank Car Corporation has booked 1400 tank cars for the Island Refining Co., which appears to be the largest item in steel cars. The steel bar market is getting stiffer, one maker having raised the price to 2.40c., Pittsburgh, largely owing to its well-filled order books, and another mill expects to be on a 2.50c. basis in a week or two. As intimated last week bar iron has

stiffened and apparently all makers are asking 2.50c., Pittsburgh. Accordingly, we quote as follows: Mill shipments: Bar iron, refined grade, 2.77c.; double refined bar iron, 3.77c.; soft steel bars, 2.62c.; shapes, 2.72c.; plates, 2.92c.; all New York.

Warehouse Business.—The growth of actual business is slow throughout this section and this is generally attributed to the ability of the mills to meet demands for small quantities with deliveries prompt enough to compete with warehouses. Such conditions apply especially to the trade in shapes and plates. Comparative slackness here in jobbing compared with the mid-West is generally believed to be due largely to delays in settling war claims and to a disinclination to buy materials heavily during the present labor unrest. Prices for box annealed black sheets have been advanced \$3 per ton, and for galvanized, \$5 per ton. These increases, amounting to 88c. per 100 lb. on black sheets and 78c. on galvanized, dealers point out as more adequate differentials than have been prevalent for some time past. The extreme slackness among large general contractors continues to hold back any increase in business in bolts and nuts, rivets, etc. One nearby foundry has cut discounts on cast-iron steam fittings from 20 and 2½ to 10 off. We quote out-of-store prices as follows: No. 10 blue annealed sheets, 4.57c.; No. 28 box annealed black sheets, 5.50c.; No. 28 galvanized, 6.75c.; steel bars, 3.37c.; structural shapes, 3.47c.; plates, 3.67c.; bands 3/16 in. Nos. 10 and 12, 4.07c.; shafting, net list.

Cast-Iron Pipe—No important public work is pending, but shortly a large project will be up for consideration and may help definitely to line up the price situation. It seems clear that with the increasing market strength in pig iron, \$50 at mill for 6-in. pipe is less subject to shading, and we quote New York prices as follows: 6-in. and heavier, \$52.30; 4-in. \$55.30; 3-in., \$62.30 and \$1 additional for Class A and gas pipe, these prices being possibly subject to a reduction in the case of an unusually attractive proposition.

Old Material.—There is comparatively little buying, though the tone of the market grows stronger continually. What is purchased is usually to fulfil old contracts, or to ship west where activity is more marked. Rises are noted this week in pipe, stove plate and carwheels which have been marked up an average of \$1. Consumers are still holding off, either expecting the market to turn lower, or waiting for the expected advance in the price of finished products to make them feel justified in paying more for scrap. One prominent dealer and broker confidently predicts heavy melting steel to be selling for \$20, New York, within a few weeks. Buying prices of dealers and brokers, New York, follow:

Steel rails, short lengths (or equivalent)	\$15.50 to \$16.00
Heavy melting steel	14.50 to 15.00
Rerolling rails	17.50 to 18.00
Relaying rails, nominal	40.00 to 41.00
Steel car axles	24.00 to 25.00
Iron car axles	27.00 to 28.00
No. 1 railroad wrought	22.00 to 23.00
Wrought iron track	16.00 to 17.00
Forge fire	10.00 to 10.50
No. 1 yard wrought, long	18.00 to 18.50
Light iron	6.00 to 7.00
Cast borings (clean)	10.00 to 10.50
Machine-shop turnings	10.00 to 10.50
Mixed borings and turnings	9.00 to 9.50
Iron and steel pipe (1 in. minimum diameter) not under 2 ft. long	16.00 to 16.50
Stove plate	17.00 to 17.50
Locomotive grate bars	17.00 to 17.50
Malleable cast (railroad)	15.00 to 16.00
Old carwheels	21.50 to 22.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, are:

No. 1 machinery cast	\$23.00 to \$23.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	21.50 to 22.00
No. 1 heavy cast, not cupola size	16.00 to 16.50
No. 2 cast radiators, cast boilers, etc.	17.50 to 18.00

W. L. Lindsley, formerly with the Trumbull Steel Co., Warren, Ohio, has organized the Lindsley Co. to deal in iron, steel and other metals. Offices are in the Woolworth Building, New York.

St. Louis

ST. LOUIS, Mo., July 28.

Pig Iron.—A considerable increase in buying is reported with more transactions in Southern pig iron, in spite of the freight differential on metal laid down in St. Louis. This is attributed to the filling up of the northern furnaces. The southern furnace representatives are disinclined to take orders for anything beyond last quarter delivery at present prices and, in fact, are indisposed to sell at present figures beyond the supply piled up in the furnace yards. The demand is coming from the stove interests and general foundry trade, including gray iron and malleable melters. The tonnage runs into good figures in the aggregate, but few individual tonnages beyond 500 tons are moving. Southern furnaces generally are holding firmly for the established prices, and there is a revival of talk of advances owing to higher costs of production. Steel foundries are still inactive; none of the big buyers of basic are in the market and there is little indication as to when they will be.

Coke.—The call for coke is in good volume, but none is being sold beyond fourth quarter, because of the indisposition of producers to commit themselves beyond that point because of uncertainties of labor and other costs. Connellsville foundry coke is selling at \$5.50, ovens, while New River coke is being quoted as high as \$8. The demand is increasing and an active fall is now assured.

Old Material.—A disposition to soften prices which was apparent early in the week disappeared quickly, and prices are now firmer than ever, with the dealers still speculating and reinforced in their buying disposition by the fact that some of the mills are beginning to nibble at the market. Government material continues to appear and the offerings are engaging considerable attention on the part of the scrap dealers. The activity in the pig iron market is having its effect on scrap, particularly the disposition of furnaces to hold for higher prices on future deliveries and their unwillingness to commit themselves far ahead. We quote dealers' prices, f.o.b. customers' works, St. Louis industrial district, as follows:

Per Gross Ton

Old iron rails	\$23.00 to \$23.50
Old steel rails, rerolling	28.50 to 29.00
Old steel rails, less than 3 ft.	23.50 to 24.00
Relaying rails, standard sections, subject to inspection	38.00 to 40.00
Old carwheels	24.50 to 25.00
No. 1 railroad heavy melting steel ..	20.50 to 21.00
Heavy shoveling steel	18.50 to 19.00
Ordinary shoveling steel	17.50 to 18.00
Frogs, switches and guards, cut apart	20.50 to 21.00
Ordinary bundled sheets	11.50 to 12.00
Heavy axle and tire turnings	14.00 to 14.50

Per Net Ton

Iron angle bars	\$21.00 to \$21.50
Steel angle bars	18.50 to 19.00
Iron car axles	33.00 to 33.50
Steel car axles	29.00 to 29.50
Wrought arch bars and transoms ..	22.50 to 23.00
No. 1 railroad wrought	19.50 to 20.00
No. 2 railroad wrought	18.50 to 19.00
Railroad springs	19.00 to 19.50
Steel couplers and knuckles	18.00 to 18.50
Locomotive tires, 42 in. and over, smooth inside	21.00 to 21.50
No. 1 dealers' forge	17.50 to 18.00
Cast iron borings	11.00 to 11.50
No. 1 busheling	17.00 to 17.50
No. 1 boiler cut to sheets and rings ..	16.00 to 16.50
No. 1 railroad cast	24.50 to 25.00
Stove plate and light cast	20.50 to 21.00
Railroad malleable	17.00 to 17.50
Agricultural malleable	17.00 to 17.50
Pipes and flues	17.00 to 17.50
Heavy railroad sheet and tank	16.00 to 16.50
Railroad grate bars	18.50 to 19.00
Machine shop turnings	11.50 to 12.00
Country mixed	14.50 to 15.00
Uncut railroad mixed	16.50 to 17.00
Horseshoes	21.00 to 22.00

Finished Iron and Steel.—The buying of finished products is improving steadily, but more rapidly in the general lines than in the structural field, because of

the absence of building and of railroad buying for bridge work. The delivery dates are being extended somewhat because of the aggregate of the present demand. Prices remain firm at the established quotations. Stock out of warehouse is moving freely. For stock out of warehouse we quote as follows: Soft steel bars, 3.44c.; iron bars, 3.44c.; structural material, 3.54c.; tank plates, 3.74c.; No. 8 sheets, 4.59c.; No. 10 blue annealed sheets, 4.64c.; No. 28 black sheets, cold rolled one pass, 5.69c.; No. 28 galvanized sheets, black sheet gage, 7.04c.

Cleveland

CLEVELAND, July 29.

Iron Ore.—The ore market is apparently at a standstill, as there are no reports of sales or inquiries in the week. Shipments for July are expected to show a gain of 300,000 to 500,000 tons over June, when the movement fell slightly below 8,000,000 tons. In July, 1918, a record was made with a movement of 10,659,203 tons. The Steel Corporation is shipping ore at about the same rate as earlier in the season, the increase in the movement during July being due to the heavier shipments by independent interests. Ore prices delivered f.o.b., lower Lake ports, are as follows:

Old range Bessemer, \$6.45; old range non-Bessemer, \$5.70; Mesaba Bessemer, \$6.20; Mesaba non-Bessemer, \$5.55.

Pig Iron.—The market became somewhat more active in the week. There was an increase in the volume of local business, several Cleveland foundries placing orders for lots around 1000 tons for the last half, and local sellers report a good demand for foundry iron from the East. One interest expects that its July sales will equal those of June owing to the orders booked recently from the Eastern trade. Another interest reports sales in the week aggregating 24,000 tons in foundry and malleable iron, a small portion of which was for the first-half. These include 5000 tons of foundry iron by an Ohio consumer and 6000 tons of malleable iron placed by an Indiana melter. A fair volume of inquiry is now pending from this territory, including one for 1500 tons of foundry iron from a nearby consumer. It is claimed that many of the smaller consumers in this territory have not yet covered for their fourth quarter requirements, and the increased activity in the past few days is attributed to the belief that foundries have become convinced that prices will not go lower and may become higher. Price shading on foundry iron which has been cropping out here and there at various Ohio shipping points during the past few weeks has apparently now entirely disappeared. Steel-making iron is beginning to show a little life. A central Ohio consumer has purchased 1000 tons of basic from a northern Ohio furnace at the regular price for early shipment and would have taken 7000 or 8000 tons more were the furnace willing to sell the additional tonnage. A Valley consumer is inquiring for 10,000 tons of basic for the last-half. Some steel-plant interests that produce a surplus of basic iron are inclined to keep a good surplus stock in reserve with a view of possibly using more pig iron and less scrap in their mixture, provided they are compelled to pay \$22 or higher for heavy melting steel scrap. We quote delivered Cleveland, as follows:

Bessemer	\$29.35
Basic	26.15
Northern No. 2 foundry, silicon, 1.75 to 2.25	27.15
Southern foundry, silicon, 2.25 to 2.75	33.00
Gray forge	26.15
Ohio silvery, silicon, 8 per cent.	42.65
Standard low phos., Valley furnace	\$38.00 to 40.00

Finished Iron and Steel.—The finished steel market continues active in nearly all lines. Consumers are now mostly under contract for either the third quarter or last half, and are specifying very liberally on contracts, particularly for steel bars. Considerable new demand is coming from the automobile field, and a Cleveland consumer has just placed 2000 tons of spring steel and wants 4000 tons additional for its last-half

requirements. The demand for sheet bars has become very active. A local mill reports the sale of 5000 tons for August and September delivery, and was compelled to turn down other inquiries aggregating 15,000 to 20,000 tons. The McKinney Steel Co. is now operating its plant at full capacity in all departments. The demand for plates has improved, and one local mill is filled up for about 60 days. Price shading on plates has evidently about disappeared. Structural work continues to come out in good volume. The American Bridge Co. has taken 4000 tons for plant additions for the American Rolling Mill Co., Middletown, Ohio; the Fort Pitt Bridge Co., 2000 tons for the Allen Theater and office building, Cleveland; the Case Crane & Engineering Co., 300 tons for plant extensions for the Jeffrey Mfg. Co., Columbus, Ohio; the Gem Iron Works, 275 tons for a building for the Globe-Wernicke Co., Cincinnati; the National Iron & Wire Co., 120 tons for a public bath house, Cleveland, and the King Bridge Co. is low bidder on 1700 tons for the county jail, Cleveland. The demand for hard steel bars for reinforcing work continues heavy, and some of the mills are 30 days behind on shipments. The Paul Building, Cleveland, will require 600 tons, 200 of which have been placed. Price shading on hard steel reinforcing bars has apparently about disappeared. New demand for sheets is still active, and some of the Ohio mills are so well filled up they are turning down inquiries. Prices are firm. Warehouse prices are as follows:

Steel bars, 3.27c.; plates, 3.57c.; structural shapes, 3.37c.; bands and hoops, 3.97c.; No. 10 blue annealed sheets, 4.47c.; No. 28 black sheets, 5.27c.; No. 28 galvanized sheets, 6.62c.

Coke.—Some contracting of foundry coke was done during the week at \$5.25 for standard Connellsville makes and a number of producers have advanced their price to \$5.50 per net ton at oven for both prompt shipment and contract.

Old Material.—A Cleveland consumer has just purchased 2000 tons of heavy melting steel scrap at \$19 from a yard dealer's stock, and turned down a round tonnage that was offered at \$22. These prices do not support the contention that dealers have made in the past two or three weeks that a round tonnage of steel scrap could not be bought under \$25. However, the market generally is very firm, and dealers are selling heavy melting steel scrap in transactions among themselves at least 50c. a ton higher than a week ago. There is still considerable trading between dealers, and several lots of heavy melting steel have sold at \$21.50 and one dealer is reported to be offering \$22. Several yard dealers have disposed of a portion of their stocks of heavy melting steel scrap, making a good profit at present prices, and the supply of this grade is not plentiful. Borings are about \$1 a ton higher, and several other grades have been marked up. Turnings are slightly easier. There is a heavy demand for short shoveling and turnings for blast furnaces, which are quoted at \$14 to \$14.50. We quote delivered consumers' yards in Cleveland and vicinity per gross ton as follows:

Heavy melting steel	\$21.00 to \$22.00
Steel rails, under 3 ft.	23.00 to 23.50
Steel rails, rerolling	25.00 to 25.50
Iron rails	27.00 to 28.00
Iron car axles	35.00 to 36.00
Steel car axles	33.00 to 34.00
Low phosphorus melting scrap	22.50 to 23.00
Cast borings	15.00 to 15.50
Iron and steel turnings and drillings	11.50 to 12.00
Compressed steel	18.50 to 19.00
No. 1 railroad wrought	23.50 to 24.50
Cast iron car wheels	24.50 to 25.00
Agricultural malleable	18.50 to 19.50
Railroad malleable	22.00 to 22.50
Steel axle turnings	17.50 to 18.00
Light bundled sheet scrap	15.50 to 16.50
No. 1 cast	23.50 to 24.50
No. 1 busheling	20.00 to 20.50
Drop forge flashings, 10 in. and under	17.50 to 18.50
Drop forge flashings, over 10 in.	15.50 to 16.00
Railroad grate bars	19.00 to 20.00
Stove plate	19.00 to 20.00

Bolts, Nuts and Rivets.—Bolt and nut manufacturers are getting a heavy volume of specifications on contracts, and some business in current orders is being booked at the new prices, which are firmly maintained.

Deliveries are slowing up somewhat because makers are unable to get wire shipments from the mills as fast as needed. The demand for rivets continues heavy, orders being mostly in the form of specifications on contracts. Rivet prices are firm.

Cincinnati

CINCINNATI, July 29.

Pig Iron.—A Virginia furnace has announced an advance of \$1, making its base price \$27.75 for 1.75 to 2.25 silicon, but has not sold any iron in this territory at this figure. A few small sales of prompt Southern iron have been made above the schedule by a furnace not in the Birmingham district proper. One southern furnace has openly come out offering iron for the last quarter at the regular schedule but other producers in that district are slow in following. There is a steady inquiry for foundry iron for both last quarter and first quarter shipment but for the latter delivery neither the northern nor the southern furnaces are willing to quote. Reliable information from the South indicates that furnace stocks are being steadily depleted, and the same condition also exists in the Ironton district. A Michigan melter bought 1000 tons of southern iron for August and September shipment at the full schedule. Quite a number of scattered smaller sales are reported for nearby delivery. A little Northern iron has also been disposed of. The Ohio silvery iron situation is unchanged and Jackson county furnaces are not willing to take on any new business and are holding their yard stocks to fill old contracts. However, they are handicapped in shipping because of the difficulty in getting labor. They have also been held up to some extent in making the necessary furnace repairs for the same reason. Malleable and basic are both quiet, with no demand here for either. All pig iron interests are eager for news regarding export iron, as should the export demand develop to any considerable extent it is expected that a serious shortage will develop in the South, in spite of the fact that a number of furnaces there have either blown in lately or contemplate doing so at an early date.

Based on freight rates of \$3.60 from Birmingham and \$1.80 from Ironton, we quote f.o.b. Cincinnati:
 Southern coke, silicon, 1.75 to 2.25 (base price)\$30.35
 Southern coke, silicon, 2.25 to 2.75 (No. 2 soft) 31.60
 Ohio silvery, 8 per cent silicon 42.05
 Southern Ohio coke, silicon, 1.75 to 2.25 (No. 2) 28.55
 Basic, Northern 27.55
 Standard Southern carwheel 51.60
 Malleable 29.05
 Lake Superior charcoal\$32.35 to 33.35

Finished Material.—A local jobbing house has received notice of an advance of \$2 a ton on both black and galvanized sheets, but the general formal quotations have not been changed, though they are firmer. The price of No. 28 black sheets is 4.35c., Pittsburgh, and No. 28 galvanized 5.70c., with a freight rate to Cincinnati of 23c. per 100 lb., and it is now stated that these figures are not being shaded. In spite of advances by some independents on wire goods, local jobbers are still selling wire nails at \$3.75 per keg, base, and report an improved demand, especially from retail hardware dealers. Structural shapes are moving more freely and there is also a better demand for cold-rolled shafting, the latter being quoted at 5 per cent off list for outside shipments. A mill agency reports some fairly heavy sales of bolts and nuts recently that will absorb its available supply for the next few months.

The following are present local jobbers' prices: Steel and iron bars, 3.33c. base; bands, 4.03c. base; structural shapes, 3.43c. base; plates, 1/4-in. and heavier, 3.63c. base; No. 10 blue annealed sheets, 4.53c.; wire nails, \$3.75 per keg base.

High Speed Steel.—Business is reported by different selling agencies as being fair, and standard brands remain at \$1.50 per lb. base.

Fluorspar.—Business is quite dull, so far as new sales are concerned, as consumers have covered their requirements through the next few months. Washed

gravel fluorspar is unchanged at \$25 per ton at point of shipment.

Coke.—The market continues to gain strength in all districts. A report was received this morning that a round tonnage of furnace coke was sold in the Connellsville field at \$4.25 per net ton at oven. Foundry coke is firmer, and \$5.50 is now minimum, with \$6 asked by a number of producers. Foundry coke is scarce, both in the Wise County and New River fields, and in the former it is bringing \$7.50, at oven, while New River quotations are strong at \$8. Pocahontas foundry grades range from \$7 to \$7.50. There is also a growing scarcity in that field. Producers are unwilling as a rule to contract beyond Dec. 31.

Old Material.—The advances made last week appear to be firmly established and optimistic reports are made by all dealers. Scrap melters who are not covered through the year are buying quietly and more heavily than during the past few weeks. Yard stocks are increasing, but at a very slow rate, as not much scrap is being drawn from the railroads. There is a marked improvement in shipments going forward to the Cleveland and Pittsburgh districts.

The following are dealers' buying prices f.o.b. at yards, in carload lots, southern Ohio and Cincinnati:

Per Gross Ton	
Bundled sheet	\$13.00 to \$13.50
Old iron rails	22.75 to 23.25
Relaying rails, 50 lb. and up.....	40.00 to 41.00
Rerolling steel rails	21.50 to 22.00
Heavy melting steel	17.50 to 18.00
Steel rails for melting.....	17.50 to 18.00
Old carwheels	19.00 to 20.00
No. 1 railroad wrought.....	19.00 to 19.50
Per Net Ton	
Cast borings	\$8.50 to \$9.00
Steel turnings	7.00 to 7.25
Railroad cast	22.00 to 22.50
No. 1 machinery	23.00 to 23.50
Burnt scrap	13.00 to 14.00
Iron axles	25.00 to 26.00
Locomotive tires (smooth inside)....	18.00 to 18.50
Pipes and flues	14.00 to 16.00
Malleable cast	16.50 to 17.00
Railroad tank and sheet	13.00 to 13.50

British Iron and Steel Market

Coal Crisis Settled but Steel Business Disorganized—Prices and Conditions in Germany

(By Cable)

LONDON, ENGLAND, July 28.

The coal crisis has been settled by the usual method of conceding demands, but the alliance of labor is a close one and acute phases are yet to develop because politicians are merely temporizing for electoral purposes. The real issues must be fought out later, including nationalization. The first week of the 7-hr. day in Wales has involved a loss in the output of coal at the rate of 10,000,000 tons a year.

Iron and steel business is disorganized owing to the uncertainty as to costs and in the meantime quotations are nominally unaltered. Many plants are closed or are closing for want of fuel or because of strikes. The Ebbwvale company has paid off all its hands. A small tin-plate order has been taken by Wales for Mexico, and Japan is buying freely, the basis price being about 34s. (\$7.43) f.o.b., but irregular business has been done at 34s. 6d. (\$7.54).

There have been small offerings of Belgian bar iron at £16 7s. 6d. (\$71.56), and of steel rods, 3/16 to 1/2 in., at £17 5s. (\$75.38), f.o.b. Antwerp.

German steel plants are greatly hampered by lack of raw material and by rising costs of labor. Arrangements with Sweden should provide large quantities of ore henceforth, but supplies of coal are gravely deficient and railroad facilities shockingly bad; many rolling mills are operating at only 25 per cent capacity. A labor crisis is apparently impending and employers are resisting continual demands. The Siemens-Halske Co., at Berlin, has just discharged 10,000 employees and the

Allgemeine Elektrizitäts Gesellschaft threatens to close, also the Vulcan shipyards at Hamburg, because of the impossibility of conceding demands.

The pig-iron prices of the Steel Works Union are now 460.50 marks (\$28.78, with marks at 6¼c.) for hematite iron; 395 m. (\$24.69) for Siegerland iron; 432 m. (\$27.00) for spiegeleisen; 439 m. (\$27.44) for No. 1 foundry iron and 438 m. (\$27.37) for No. 2. The Steel Works Union says it will not increase prices further, but the market is chaotic, with the price for thin sheets at 900 m. (\$56.25) with 2000 m. (\$125.00) realized by dealers, and with thick sheets officially quoted at 650 m. (40.62), but 1000 m. (\$62.50) actually obtained. The Steel Works Union is to be liquidated and a new one formed to include at first the Rheinisch-Westphalian Works, the Maximilian Hütte, the Ilseeder Hütte at Peine, the Georgsmarien Hütte, the Van der Zypen and the Dohlen plants. The Saar and the Laura works are excluded but may enter later.

The German pig-iron output for May was 525,000 metric tons against 546,000 tons for March and 434,000 tons for April and the steel output 598,000 tons. The Krupp company is to manufacture locomotives and rolling stock for the State on the basis of all the profit over a fixed percentage to go to the State, while the company stands any losses.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalents figured at \$4.37 for £1, with the reservation that most makers have temporarily withdrawn prices:

Pig Iron:	£	s.	d.	£	s.	d.	
East coast hematite...	10	0	0	to 10	5	0	\$43.70 to \$44.79
West coast hematite...	9	12	6	.....			42.06
Cleveland No. 3 foundry							
dry	8	0	0	to 8	5	0	34.96 to 36.05
Cleveland basic	8	5	0	to 8	10	0	36.05 to 37.14
Ferromanganese	25	0	0	.....			109.25
Billets	13	17	6	to 15	0	0	60.63 to 65.55
Tin plate and sheet bars...	13	7	6	.....			58.45
Rails, 60 lb. and upward	16	0	0	.....			69.92
							Cents per lb.
Steel bars	19	15	0	.....			3.85
Large rounds, etc.....	17	17	6	.....			3.48
Structural material:							
Beams	17	0	0	.....			3.32
Plates	17	15	0	.....			3.46
Plates, boiler	21	0	0	.....			4.09
Bar iron, stand, crown...	21	0	0	.....			4.09
Tin plates, 14 x 20, coke 1	14	0	0	.....			\$7.43
112 sheets, 108 lb., f.o.b. Wales.							

Export Business

Higher Export Wire Prices—Some Miscellaneous Sales

One of the interesting developments in export trade is that various independent steel companies which export through the Consolidated Steel Corporation have advanced wire products and also wire rods for export \$5 a ton, effective July 28. The exception is that wire products sent into Canada are put through at the domestic prices, but wire rods for Canadian delivery have also been advanced \$5. It is understood that the United States Steel Products Co., the export branch of the United States Steel Corporation, has made a similar advance. This puts wire nails at \$3.50 per keg, galvanized barbed wire at \$4.35 per 100 lb., fence wire at \$3.25 and galvanized wire at \$3.95, and wire rods at \$57 per ton.

It is not likely that the total of July's export business will equal that of June. Many large inquiries of the latter half of the month are still open at this writing.

Some of the sales which have been made include the following: 4000 tons of billets by the United States Steel Products Co. to England; 3600 tons of pig iron, 12 locomotives for the Dutch East Indies; 8000 tons of various forms of steel to the Dutch East Indies, including plates, sheets, bars and angles from the United States Steel Products Co.; 217 tons of wrought pipe for Spain, following a recent sale of 300 tons from the same buyers.

EXPORT GAINS ENORMOUS

Will United States be Free with Credit?—

Poland's Railroad Needs

WASHINGTON, July 28.—The United States has leaped to the front in its exports even more rapidly than Government officials or others conversant with the developments in the post-war trade situation had imagined. Figures on June exports show a remarkable jump of more than \$200,000,000 from the previous record month in the history of the nation, May of this year. The June exports, totaling \$918,000,000, brought the total for the fiscal year 1919 to \$7,225,000,000, a new record. The exports for the fiscal year ending June 30, 1918, were \$5,920,000,000, a total not much larger than the exports in the months since the signing of the armistice.

The excess of exports over imports for the fiscal year 1919 was \$4,129,000,000, against \$3,000,000,000 in the previous year, and less than \$500,000 in 1914.

Secretary Redfield's Serious Question

As viewed by Secretary of Commerce Redfield, this tremendous showing in exports, while one to be proud of, also serves to call attention to the serious condition involving the financing of these foreign purchases. "I am frankly shocked by these figures," said Secretary Redfield. "There might be a little tendency to exult over them, but the real significance is a deeper one and more of a serious nature. The figures involve a tremendous responsibility and opportunity. Some of our bankers see what is necessary in the financing of these exports, but others haven't yet waked up to it.

"The United States of America is ahead of its financial and commercial leaders. We are loaded with wealth. We have got gold, goods and equipment, everything the world wants. The world is starving for what we have.

"I have the case of Poland before me now. Poland has 5000 miles of railroads and no cars or locomotives. Poland wants cars and locomotives from us, but some means must be provided by which they can be paid for. Whoever gets that business will have it for all time, because there cannot be a mixing of standards in railroad equipment. Have our bankers and manufacturers got the vision to handle the situation?

"The world has made in it an enormous commodity vacuum. We have used up in war vast quantities of commodities and at the same time we stopped many millions of men from producing. The world is literally starving, not only for commodities but for means to buy them, because the destruction of wealth has destroyed credit. In that position we have the commodities and the credits. Are we big enough for the job?

"This country was never so wealthy as to-day. Here is the call of the world to America just as truly as when the Germans were forty miles from Paris."

Prompt Action Urged

In a letter to a steel manufacturer, made public by Mr. Redfield, he touched on the foreign credits problem as follows:

"I am convinced that we must act with reasonable promptness and unusual courage in the matter of foreign credits if we are either to secure the business which should come to us, or to play the helpful part in the world which our circumstances permit and which our sense of duty to the world ought to require. I have noted Mr. Davison's conferences with much interest and hope. Several plans have been suggested for the Government taking part in the matter. Senator Edge has introduced one bill, and others have been pro-

posed. My own feeling is that it would be better if the Government could be kept out of it, but this is hardly possible because of the assurance the Government's participation would secure. It is then rather a question as to what form the Government's part should take. I would rather it had the form of approval from the Federal Reserve Board than the form of actual ownership.

"However the thing is done, it is important that it should be done soon, and we should neither expect nor wait for the ordinary form of commercial and banking security which in former times we could have expected.

League of Nations and Credit

Regarding the League of Nations as related to American commerce, Mr. Redfield said in the letter:

"The facts, as you state them, show how urgently the formation of a league of nations is needed by our American commerce. With it in existence Poland will be secure against external aggression, which is her chief danger. Her stability, therefore, being thus determined, her revenues will be a basis for credit. So long, however, as that country or any other country may be a prey to a stronger neighbor while the rest of the world looks on helplessly, there will certainly be credit difficulties. The commerce of the United States urgently requires that the treaty within the league be ratified promptly in order that it may utilize the opportunity now open, but which, if neglected, is certain to pass into other hands."

Buying for \$8,000,000 Steel Plant Construction in France

A commission of four engineers is now in this country to secure equipment for the rebuilding of two plants of the Compagnie des Forges et Aciéries de la Marine et d'Homécourt. These plants are those at Homécourt and at Hautmont. The plan is to provide the best of modern equipment and no special concern appears to be taken over the finances, as these will be provided for by the Germans. Apparently the larger amount of the equipment, to cost in all \$8,000,000, will come from American mill machinery manufacturers. The commission, whose headquarters are at the Vanderbilt Hotel, New York, is headed by Charles de Verdiere, who spent some time in this country three years ago in connection with war contracts for his company. The other members are Paul Coumert, metallurgist, and Emile Hemmer and Eugene Robert, engineers.

Railroad Strike Hampers Wire Company

Operations in the plants of the American Steel & Wire Co. in the Newburgh district, Cleveland, have been curtailed 50 per cent or more and 4000 employees have been forced to quit work by a strike of 300 engineers, firemen and switchmen, employed by the Newburgh & South Shore Railroad, a U. S. Steel Corporation subsidiary. They went out July 28 to enforce demands for a wage increase of about 75 per cent. The strike necessitated the banking of blast furnaces and complete or partial suspension of work in some of the mill departments. The plants affected include the Central furnaces, Newburgh steel and wire works, and Cuyahoga works.

The Bessemer Limestone Co., Youngstown, Ohio, has been changed from a Pennsylvania to an Ohio corporation, the capital stock has been increased from \$1,000,000 to \$3,000,000, and its name changed to the Bessemer Limestone & Cement Co. The reorganized company intends to engage in the manufacture of cement on a large scale and will erect a cement plant at Bessemer, Pa., adjoining its limestone quarries. It will have a capacity of 3000 bbl. of cement per day.

IRON AND INDUSTRIAL STOCKS

Heavy Trading Maintained—Steel Shares Strong—Coppers Firm

NEW YORK, July 29.

The market maintained its activity at the rate of over 1,000,000 shares per day until Monday, when a decided slowing down to about 800,000 shares was recorded. The impending quarterly report of the Steel Corporation on Tuesday was ascribed as one cause. The net result of the week's trading, however, was an advance in most of the steel shares, steel common reaching a high for the year of 113 $\frac{3}{4}$ early last week, but reacting later and then advancing again. Crucible was again a feature, advancing at one time to 144 $\frac{1}{2}$. The equipment shares were strong and the coppers were steady. The range of prices on active iron and industrial stocks from Tuesday of last week to Wednesday of this week was as follows:

Allis-Chalm. com. 45 - 49	La Belle Ir. pf. 123 $\frac{1}{4}$ - —
Allis-Chalm. pf. 95 - 96	Lackaw. Steel... 86 - 89 $\frac{1}{4}$
Am. Can com. 58 $\frac{1}{2}$ - 61	Lake Sup. Corp. 22 - 24 $\frac{3}{4}$
Am. Can pf. 105 - —	Lim. Loco. 82 - 93
Am. C. & Fd. cm. 116 $\frac{1}{2}$ - 121 $\frac{1}{4}$	Midvale Steel ... 56 $\frac{1}{2}$ - 59 $\frac{1}{4}$
Am. C. & Fd. pf. 115 $\frac{3}{4}$ - —	Nat.-Acme 38 $\frac{1}{2}$ - 42
Am. Loco. com. 90 $\frac{1}{2}$ - 93 $\frac{3}{4}$	Nat. E. & St. cm. 80 $\frac{1}{2}$ - 83 $\frac{1}{2}$
Am. Loco. pf. 107 - —	Nat. E. & St. pf. 102 - —
Am. Radiator cm. 325 - —	N. Y. Air Brake. 122 - 123
Am. Ship com. 130 - —	Nova Scotia Steel 83 $\frac{1}{2}$ - 87 $\frac{1}{4}$
Am. Stl. Fdries. 44 $\frac{1}{4}$ - 46	Penn-Seaboard .. 50 - 54 $\frac{1}{2}$
Bald. Loco. com. 111 $\frac{1}{4}$ - 119 $\frac{3}{4}$	Pittsb. Steel pf. 96 - —
Bald. Loco pf. 106 $\frac{1}{4}$ - 106 $\frac{1}{2}$	Pressed Stl. com. 90 - 93 $\frac{1}{4}$
Beth. Steel com. 97 $\frac{1}{2}$ - 101 $\frac{1}{2}$	Pressed Stl. pf. 106 - —
Beth Stl. Cl. B. 98 - 106	Ry. Stl. Spg. com. 94 - 96 $\frac{1}{2}$
Case, J. I. pf. 99 $\frac{1}{2}$ - 100	Ry. St. Spg. pf. 109 $\frac{1}{2}$ - 110
Central Fdy. com. 34 - 45	Republic com. 95 $\frac{1}{2}$ - 99
Central Fdy. pf. 66 - 74 $\frac{1}{4}$	Republic pf. 105 $\frac{1}{2}$ - 104 $\frac{1}{2}$
Chic. Pneu. Tool. 79 - 80 $\frac{3}{4}$	Sloss com. 69 - 73
Colo. Fuel 50 - 52 $\frac{1}{2}$	Superior Steel... 45 - 46 $\frac{1}{2}$
Cru. Steel com. 137 - 144 $\frac{1}{2}$	Transue-Williams 56 $\frac{1}{2}$ - 68 $\frac{3}{4}$
Cru. Steel pf. 103 - 104 $\frac{1}{2}$	Un. Alloy Steel.. 53 $\frac{1}{4}$ - 58 $\frac{1}{2}$
Deere & Co. pf. 102 - 103	U. S. Pipe com.. 32 - 34
Gen. Electric ... 167 $\frac{1}{2}$ - 171	U. S. Pipe pf. 69 - 70 $\frac{1}{2}$
Gt. No. Ore. Cert. 47 $\frac{1}{2}$ - 50 $\frac{1}{2}$	U. S. Steel com. 110 $\frac{1}{4}$ - 113 $\frac{3}{4}$
Gulf St. Steel... 67 $\frac{1}{2}$ - 71	U. S. Steel pf. 116 $\frac{1}{2}$ - 117 $\frac{1}{4}$
Int. Har. com. 139 $\frac{1}{4}$ - 141 $\frac{1}{2}$	Va. I. C. & Coke 65 - 67
Int. Har. pf. 116 - 118	Warwick 8 $\frac{1}{2}$ - —
La Belle Ir. com. 111 $\frac{1}{2}$ - 117	Westingh. Elec. 56 - 58 $\frac{1}{4}$

Dividends

American Brass Co., quarterly, 1 $\frac{1}{2}$ per cent and extra 1 $\frac{1}{2}$ per cent, payable Aug. 15.

Bethlehem Steel Co., quarterly, 1 $\frac{1}{4}$ per cent on the common, 1 $\frac{1}{4}$ per cent on common B, 1 $\frac{1}{4}$ per cent on non-cumulative preferred, and 2 per cent on cumulative convertible preferred, all payable Oct. 1.

By-Products Coke Corporation, quarterly, 1 $\frac{1}{2}$ per cent, payable Aug. 15.

Colorado Fuel & Iron Co., quarterly, $\frac{3}{4}$ per cent on common and 2 per cent on preferred, payable Aug. 20.

Dominion Bridge Co., Ltd., quarterly, 2 per cent, payable Aug. 15.

Lim. Locomotive Works, Inc., quarterly, 1 $\frac{1}{4}$ per cent on preferred, payable Aug. 11.

National Acme Co., quarterly, 75c., payable Sept. 1.

Ontario Steel Products Co., quarterly, 1 $\frac{1}{4}$ per cent on preferred, payable Aug. 15.

Pressed Steel Car Co., quarterly, 1 $\frac{1}{4}$ per cent on preferred, payable Aug. 26, and 2 per cent on common, payable Sept. 3.

Semet-Solvay Co., quarterly, 2 per cent, payable Aug. 15.

Standard Sanitary Mfg. Co., quarterly, 1 $\frac{1}{4}$ per cent on the preferred, and 2 per cent on the common, payable Aug. 9.

Westinghouse Electric & Mfg. Co., quarterly, 2 per cent, \$1.00 per share, on the common, payable July 31.

A net operating profit of approximately 10 per cent of its outstanding capital, \$509,200, is reported for the first half of 1919 by the Maibohm Motors Co., Sandusky, Ohio. The new plant at Sandusky, of a rated capacity of 50 cars per day, is nearly completed.

The Edgar T. Ward's Sons Co., steel merchant, 646 Washington Boulevard, Chicago, has opened a new warehouse in Detroit, at 660 West Fort Street, in charge of W. F. Reulman.

The Page Steel & Wire Co. has opened a branch office in Chicago, at 29 South LaSalle Street.

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery							
	Copper, New York		Tin, New York	Lead		Zinc	
	Lake	Electro- lytic		New York	St. Louis	New York	St. Louis
July							
23.....	23.75	23.50	70.00	5.75	5.25	8.40	8.05
24.....	23.75	23.50	70.00	6.00	5.75	8.35	8.00
25.....	23.75	23.50	70.00	6.00	5.75	8.25	7.90
26.....	23.75	23.50	....	6.00	5.75	8.25	7.90
28.....	23.75	23.50	70.00	6.00	5.75	8.20	7.85
29.....	23.75	23.50	70.00	6.00	5.75	8.15	7.80

NEW YORK, July 29.

The markets are generally quiet, but prices are firm and a fair business has been done in copper, with no advance in prices from last week. The tin market continues rather quiet. Lead has again advanced and a good demand is recorded. In the zinc market a temporary reaction has taken place and prices are lower. Antimony is practically unchanged.

New York

Copper.—While electrolytic copper for early delivery is not plentiful from all sources, it can be obtained in reasonable quantities in certain quarters. The amount of business done in the past week has not been at the rapid rate of the previous two or three weeks, but a substantial turnover is reported. For the first time in several weeks prices have not advanced. Electrolytic for early or August delivery is quoted at 23.50c. to 23.75c., New York, with futures at a premium. Most producers are unwilling to sell beyond September, or at the latest, October, in certain favored cases for which positions they ask from 24c. to 24.25c., New York. Lake copper is still rather scarce and is more or less nominal at 23.75c. to 24c. for August deliveries, with futures at a premium.

Tin.—The market has been rather quiet in the past week, but the fact that exchange rates on London have tended to become stronger has been reflected in the quotations for tin here, and these have been higher rather than lower. The attitude of sellers, however, continues to be of a varied nature, some declining to sell because of the possibility of still lower values in the exchange market, while others are more conservative and have been sellers. As a result, prices have been erratic, but generally higher in the past week. A little business has been done, mostly for future delivery, the total aggregating from 300 to 500 tons. Prices yesterday were as follows: For July shipment from the Straits, 53.50c.; for August shipment from the Straits, 53c.; for September shipment from the Straits, 52.87½c.; and for October-November shipment from the Straits, 52.50c. American pure tin is quoted at about 68c., New York, with the 99 per cent grade at about 66c., New York. Spot Straits tin is unchanged, but largely nominal, at 70c., New York.

Lead.—The American Smelting & Refining Co. again advanced its prices last Thursday, July 24, ¼c. a lb., or from 5.75c. to 6c., New York. The independents at once met this price and have been making offerings at 6c. The market is now quiet but firm with quotations at 5.75c., St. Louis, and 6c., New York, for early delivery. Lead from second hands or dealers is coming out at 6c., New York, and it is intimated that this quotation might be slightly shaded by these sellers in order to clinch a profit.

Zinc (Spelter).—There has been a decided slackening in demand and the market may be regarded as having suffered in the last week a temporary reaction. Prime Western for early or August delivery is quoted at 7.80c., St. Louis, or 8.15c., New York, with demand light. Dealers have been fairly heavy sellers in the last week, but it is believed that their stocks have been pretty well depleted. Producers are not generally meet-

ing the present levels, but are firm in the belief of a stronger market later.

Antimony.—The market is firm with wholesale lots for early delivery quoted at 9.37½c., New York, duty paid.

Aluminum.—Quotations for No. 1 virgin metal, 98 to 99 per cent pure, are unchanged at 32c. to 33c., New York, in wholesale lots for early delivery.

Old Metals.—The market is firm and advancing. Dealers' selling prices are nominally as follows:

	Cents per lb.
Copper, heavy and crucible.....	23.50
Copper, heavy and wire.....	22.50
Copper, light and bottoms.....	19.00
Brass, heavy.....	15.00
Brass, light.....	11.00
Heavy machine composition.....	20.50
No. 1 yellow rod brass turnings.....	12.75
No. 1 red brass or composition turnings.....	16.00
Lead heavy.....	5.50
Lead, tea.....	4.25
Zinc.....	6.00

Chicago

CHICAGO, July 28.—Copper is active, but not to the extent it was a week ago. It has declined slightly, this development being attributed to an over-rapid advance. There has been considerable trading in lead, which has advanced a few points. Spelter is dull and has declined. There has been no change in the price of antimony, the general feeling being that the next turn will be downward. Consumers are well supplied for some time ahead and current purchases are light. There has been no change in the prices of old metals. We quote copper at 23.75c. to 24c. for carloads; tin, 70c. to 72.50c.; lead, 5.77½c. to 5.80c.; spelter, 7.75c. to 8c.; antimony, 10c. to 11c. On old metals we quote copper wire, crucible shapes, 18c.; copper clips, 17.75c.; copper bottoms, 15.25c.; red brass, 18c.; yellow brass, 12c.; lead pipe, 4.25c.; zinc, 4.50c.; pewter, No. 1, 35c.; tin foil, 37c., and block tin, 45c., all these being buying prices for less than carload lots.

St. Louis

ST. LOUIS, July 28.—The non-ferrous markets have been growing steadily firmer the past week, with prices advancing, closing to-day as follows: Lead, car lots, 5.85c.; spelter, 8.05c. In less than car lots the quotations were: Lead, 6.10c.; spelter, 8.50c.; tin, 73c.; copper, 25c.; antimony, 10.50c. In the Joplin district the ore market continues to advance with the prices of zinc blende, calamine and lead all higher, due to the strength of the metal market. Buying has been more active and the sales are more nearly approximating the total production of the district than for some time past. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 7.50c.; heavy yellow brass, 10c.; heavy red brass, 15c.; light copper, 13c.; heavy copper and copper wire, 15c.; pewter, 35c.; tin foil, 43c.; lead, 4c.; zinc, 4c.; tea lead, 3c.; aluminum, 18c. Joplin ore prices: Lead, \$67.50 per ton basis of 80 per cent metal; zinc blende, \$55 per ton basis 60 per cent metal; calamine, \$30 per ton basis of 40 per cent metal.

Cincinnati

CINCINNATI, July 28.—Further advances have been made on brass and copper scrap. Heavy copper, crucible copper and copper wire are all around 17.50c. to 18c.; heavy red brass, 17.50c. to 17.75c.; heavy yellow brass, 12c. to 12.50c., and light brass at 8.50c. Lead is also stronger and is quoted from 4.50c. to 4.75c. Block tin pipe is weaker and is around 53c. to 55c.

The Hazard Mfg. Co., wire rope, insulated wires and cables, Wilkes-Barre, Pa., announces the opening of its Denver office and warehouse at 1415 Wazee Street, in charge of Ernest P. Kipp, who was captain in an engineering corps.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

The prices below, except on nuts, bolts and rivets, are based on those announced at Washington by the Industrial Board on March 20, 1919, effective the following day, which since that date have largely governed market transactions, though there have been variations, as indicated in market reports on other pages.

Freight rates from Pittsburgh on finished iron and steel products, including wrought iron and steel pipe, with revisions effective Nov. 1, 1918, in carloads, to points named, per 100 lb., are as follows: New York, 27c.; Philadelphia, 24.5c.; Boston, 30c.; Buffalo, 17c.; Cleveland, 17c.; Cincinnati, 23c.; Indianapolis, 25c.; Chicago, 27c.; St. Louis, 34c.; Kansas City, 59c.; St. Paul, 49½c.; Denver, 99c.; Omaha, 59c.; minimum carload, 36,000 lb. to four last named points; New Orleans, 38.5c.; Birmingham, 57.5c.; Pacific Coast, \$1.25; minimum carload, 80,000 lb. To the Pacific Coast the rate on steel bars and structural steel is \$1.315, minimum carload 40,000 lb.; and \$1.25, minimum carload 50,000 lb. On wrought iron and steel pipe the rate from Pittsburgh to Kansas City is 50c. per 100 lb., minimum carload 46,000 lb.; to Omaha, 50c., minimum carload 46,000 lb.; to St. Paul and Minneapolis, 49.5c.; minimum carload 46,000 lb.; Denver, 99c.; minimum carload 46,000 lb. A 3 per cent transportation tax applies. On iron and steel items not noted above, rates vary somewhat and are given in detail in the regular railroad tariffs:

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in. angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and Zees, structural sizes, 2.45c.

Wire Products

Wire nails, \$3.25 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of \$1.50, and shorter than 1 in., \$2.00. Bright basic wire, \$3.15 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$3.00; galvanized wire, \$3.70; galvanized barbed wire and fence staples, \$4.10; painted barbed wire, \$3.40; polished fence staples, \$3.40; cement-coated nails, \$2.85 base; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 60½ per cent off list for carload lots, 59½ per cent for 1000-rod lots, and 58½ per cent off for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....\$3.70 base
Large boiler rivets.....\$3.80
¼ in., 5/16 in. and 7/16 in. diam.....60-10-5 per cent off list
Machine bolts, hp. nuts, ¾ in. x 4 in.....60-10-5 per cent off list
Smaller and shorter, rolled threads.....50-10-10 per cent off list
Cut threads.....50-10-10 per cent off list
Larger and longer sizes.....50-5 per cent off list
Machine bolts, c.p.c. and t. nuts, ¾ in. x 4 in.:
Smaller and shorter.....45-10-5 per cent off list
Larger and longer.....40-10 per cent off list
Carriage bolts, ¾ in. x 6 in.:
Smaller and shorter, rolled threads.....50-10-10 per cent off list
Cut threads.....50-10-10 per cent off list
Larger and longer sizes.....45-5 per cent off list
Lag bolts.....65 per cent off list
Plow bolts, Nos. 1, 2 and 3.....50-10-5 per cent off list
Hot pressed nuts, sq. blank.....3.10c. per lb. off list
Hot pressed nuts, hex. blank.....3.10c. per lb. off list
Hot pressed nuts, sq. tapped.....2.85c. per lb. off list
Hot pressed nuts, hex. tapped.....2.85c. per lb. off list
C.p.c. and t. sq. and hex. nuts, blank.....3.10c. per lb. off list
C.p.c. and t. sq. and hex. nuts, tapped.....2.85c. per lb. off list
Semi-finished hex. nuts:
¾ in. and larger.....70-10 per cent off list
9/16 in. and smaller.....80 per cent off list
Stove bolts in packages.....75-10-10 per cent off list
Stove bolts in bulk.....2½ per cent extra
Tire bolts.....60-10-10 per cent off list
The above discounts are from July 21, 1919.
All prices carry standard extras, Pittsburgh basis.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, \$52; chain rods, \$60; screw, rivet and bolt rods and other rods of that character, \$60. Prices on high carbon rods are irregular. They range from \$65 to \$75, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes 9/16 in. x 4½ in. and heavier, and small spikes, per 100 lb., \$3.35 in lots of 200 kegs of 200 lb. each or more; track bolts, \$4.35 per 100 lb. in carload lots of 200 kegs or more, and \$4.90 in small lots. Boat and barge spikes, \$3.85 per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh.

Terne Plate

Prices of terne plate are as follows: 8-lb. coating, 200 lb., \$13.80 per package; 8-lb. coating, I-C, \$14.10; 12-lb. coating, I-C, \$15.80; 15-lb. coating, I-C, \$16.80; 20-lb. coating, I-C, \$18.05; 25-lb. coating, I-C, \$19.30; 30-lb. coating, I-C, \$20.30; 35-lb. coating, I-C, \$21.30; 40-lb. coating, I-C, \$22.30 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.35c. from mill. Prices on bar iron are 2.75c.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card.

Steel				Iron			
Inches	Black	Galv.		Inches	Black	Galv.	
1½, ¾ and ¾.....	50½	24		1½ and ¾.....	29½	2½	
1½.....	54½	40		¾.....	30½	3½	
¾ to 3.....	57½	44		¾.....	34½	16½	
				¾ to 1½.....	39	23½	
Lap Weld				Lap Weld			
2.....	50½	38		1½.....	24½	9½	
2½ to 6.....	53½	41		1½.....	31½	17½	
7 to 12.....	50½	37		2.....	32½	18½	
13 and 14.....	41	..		2½ to 6.....	34½	21½	
15.....	38½	..		7 to 12.....	31½	18½	
Butt Weld, extra strong, plain ends				Butt Weld, extra strong, plain ends			
1½, ¾ and ¾.....	46½	29		1½, ¾ and ¾.....	28½	11½	
1½.....	51½	39		¾.....	33½	20½	
¾ to 1½.....	55½	43		¾ to 1½.....	39½	24½	
2 to 3.....	56½	44					
Lap Weld, extra strong, plain ends				Lap Weld, extra strong, plain ends			
2.....	48½	37		1½.....	25½	10½	
2½ to 4.....	51½	40		1½.....	31½	17½	
4½ to 6.....	50½	39		2.....	33½	20½	
7 to 8.....	46½	33		2½ to 4.....	35½	23½	
9 to 12.....	41½	28		4½ to 6.....	34½	22½	
				7 to 8.....	26½	14½	
				9 to 12.....	21½	9½	

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers have been seven (7) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe have been nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots, f.o.b. Pittsburgh:

Lap Welded Steel	Charcoal Iron
3½ to 4½ in.....	40½
2½ to 3½ in.....	30½
2½ in.....	24
1½ to 2 in.....	19½
	3½ to 4½ in..... -16
	3 to 3½ in..... -1½
	2½ to 2¾ in..... +1
	2 to 2½ in..... +10
	1½ to 1¾ in..... +20

Standard Commercial Seamless—Cold Drawn or Hot Rolled

Per Net Ton	Per Net Ton
1 in.....\$327	1½ in.....\$207
1¼ in.....267	2 to 2½ in.....177
1½ in.....257	2½ to 3¾ in.....167
1½ in.....207	4 in.....187
	4½ to 5 in.....207

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiation.

Sheets

Makers' price for mill shipments on sheets of United States standard gage in carload and larger lots are as follows:

Blue Annealed—Bessemer		Cents per lb.
No. 8 and heavier.....		3.50
Nos. 9 and 10 (base).....		3.55
Nos. 11 and 12.....		3.60
Nos. 13 and 14.....		3.6
Nos. 15 and 16.....		3.75
Box Annealed, Ore Pass Cold Rolled—Bessemer		
Nos. 17 to 21.....		4.15
Nos. 22 to 24.....		4.20
Nos. 25 and 26.....		4.25
No. 27.....		4.30
No. 28 (base).....		4.35
No. 29.....		4.45
No. 30.....		4.55
Galvanized, Black Sheet Gage—Bessemer		
Nos. 10 and 11.....		4.70
Nos. 12 and 14.....		4.80
Nos. 15 and 16.....		4.95
Nos. 17 to 21.....		5.10
Nos. 22 to 24.....		5.25
Nos. 25 and 26.....		5.40
No. 27.....		5.55
No. 28 (base).....		5.70
No. 29.....		5.95
No. 30.....		6.20
Tin-Mill Black Plate—Bessemer		
Nos. 15 and 16.....		4.15
Nos. 17 to 21.....		4.20
Nos. 22 to 24.....		4.25
Nos. 25 to 27.....		4.30
No. 28 (base).....		4.35
No. 29.....		4.40
No. 30.....		4.40
Nos. 30½ and 31.....		4.45

PERSONAL

B. F. Affleck, president Universal Portland Cement Co., has been elected a director of the Great Lakes Trust Co., which opened its doors for business at Chicago on July 22. Among other directors are William Butterworth, president Deere Plow Co., Moline; Donald R. Cotton, Carnegie Steel Co., St. Paul; Samuel M. Hastings, president Computing Scale Co. of America, Chicago; David B. Pierson, vice-president Stephens-Adamson Mfg. Co., Aurora, and L. M. Viles, president Buda Co., Chicago.

George E. Jurey, chief clerk in the open hearth steel department of the Republic Iron & Steel Co., Youngstown, Ohio, has resigned, and has been appointed auditor of works of the Jones & Laughlin Steel Co., Pittsburgh. He will have his headquarters in the main offices in Pittsburgh, and will assume his new duties about Aug. 15. Mr. Jurey has been presented with a gold watch by his associates in the Republic company's offices.

Malcolm E. Gregg, who for several years has been district sales manager of the Republic Iron & Steel Co. at Buffalo, has resigned to become associated with the general sales offices of the Lackawanna Steel Co., Buffalo.

W. Stewart Horner, president National Association of Sheet and Tin Plate Manufacturers, Pittsburgh, has gone to Canada on a vacation trip to remain a month.

Randolph Owens, for 10 years with the St. Louis office of the American Sheet & Tin Plate Co., Pittsburgh, has been transferred to the Philadelphia office.

George R. Woods has announced his resignation, effective July 31, from the Allied Machinery Co. of America. He will sail for Europe Aug. 2 and will study industrial conditions abroad. He will return to New York in November and will then announce his new connection, which will be, as hitherto, in the field of exporting American metal-working machinery and small tools.

H. A. Wolcott has just been appointed district manager for the Chicago territory, representing the Ohio Locomotive Crane Co., Bucyrus, Ohio, with offices in the Lytton Building, Suite 1417-19.

Sullivan Machinery Co., Chicago, gives out the following concerning its personnel. Phillips F. Jarvis has resigned as sales manager for the territory controlled from the St. Louis office. Marion C. Mitchell has been appointed sales manager for the territory in Indiana and Illinois previously controlled from the St. Louis office, with temporary headquarters at room No. 2006, Railway Exchange, St. Louis. Don M. Sutor, formerly manager of the El Paso office, has been appointed sales manager for Western Kentucky, Western Tennessee, Missouri, Arkansas, Oklahoma, and Kansas (except the oil territory), with headquarters at room No. 2006 Railway Exchange, St. Louis. Daniel H. Hunter has been appointed sales manager for Louisiana, Texas (except the southwestern section), and the oil fields of Oklahoma and Kansas, with headquarters in Dallas, Texas.

James H. Reed, president Bessemer & Lake Erie Railroad, owned and operated by the Carnegie Steel Co., has resigned from all industrial boards on account of the present status of the co-director act. For this reason, Judge Reed has resigned as a director of the Pressed Steel Car Co., and one of his assistants, J. H. Beal, has been elected in his place.

W. Woodward Williams, general manager A. M. Byers Co., Inc., Pittsburgh, maker of wrought iron pipe, has resigned, and on Aug. 1 will become general manager of the Reading Iron Co., Reading, Pa. Mr. Williams was graduated from Harvard in 1904, his first connection being with the Carnegie Steel Co. in various capacities, for a time serving as mill foreman at the Ohio works, Youngstown, later as open hearth furnace helper at the Duquesne Steel works,

and from this position he was made assistant chief inspector of the Duquesne plant. In 1909, he left the Carnegie Steel Co. and entered the sales department of Bourne-Fuller Co., Cleveland, being connected with the Pittsburgh and St. Louis offices of that concern. In 1911, he was made district sales manager of the Bourne-Fuller Co. at Pittsburgh, and in 1913, he joined the A. M. Byers Co. as general manager of sales, holding this position until Jan. 1, 1918, when he was made general manager of the company.

B. L. Cogshall has assumed his duties as assistant to President John Bindley of the Pittsburgh Steel Co., Pittsburgh, a new position. Mr. Cogshall was for several years with the United Alloy Steel Corporation, Canton, Ohio.

The Rossendale-Reddaway Belting & Hose Co., Newark, N. J., announces the appointment of E. O. Floyd as its general sales manager, effective Aug. 1.

The Chicago Pneumatic Tool Co., Chicago, announces the appointment of N. S. Thulin as special railroad representative on the staff of S. C. Sprague, manager of western railroad sales.

John W. Barrett has been appointed fuel inspector for the Youngstown Sheet & Tube Co., Youngstown, Ohio, and will have his headquarters in the offices of that concern in the Oliver Building, Pittsburgh. Mr. Barrett has been connected with the Pittsburgh Coal Co. for several years.

O. J. Ridenour, for four years general manager Steel Expansion Boat Co., New York, and only recently secretary and assistant general manager Wright-Martin Aircraft Corporation, has become associated with the National Chain Co., New York, as vice-president and general manager.

Walter Schultz has been named chief engineer of the Slick-Knox Steel Co., Wheatland, Pa.

George T. Trundle, Jr., for 12 years chief engineer of the American Multigraph Co., Cleveland, has severed his connection with that company and opened an office as consulting engineer at 241 Engineers' Building, Cleveland. He was president of the American Fuse Manufacturers' Association.

Tong Yung, a Chinese identified with the Truscon Steel Co., Youngstown, Ohio, will leave for China shortly to introduce Truscon products there. The company plans to build a plant in Japan to meet its trade requirements in the Orient.

O. G. Stark, president Inland Machine Works, St. Louis, has acquired sole ownership of that company. The company is constructing a three-story plant on a 15-acre tract in St. Louis. The addition will be the third plant operated by the company in the manufacture of piston rings.

John Stambaugh has resigned as treasurer of the Brier Hill Steel Co., Youngstown, Ohio, and N. B. Folsom has been elected to succeed him. Mr. Folsom has been assistant treasurer. Mr. Stambaugh retires from active participation in the company to administer the Stambaugh estate. He continues as a director. Herbert J. Webb, formerly cashier, has been named assistant treasurer.

J. H. Fitch, Jr., secretary and treasurer of the Newton Steel Co., which is preparing to build a sheet mill plant at Newton Falls, Trumbull County, Ohio, has been elected president of the Newton Falls Builders' Supply Co., capital \$100,000. He was formerly assistant general sales manager of the Liberty Steel Co.

Clarence H. Howard, president Commonwealth Steel Co., St. Louis, entertained the St. Louis Junior Chamber of Commerce at his home last week and promised to donate \$1000 to the organization when its membership equals that of the senior Chamber of Commerce.

Horace S. Baker, late colonel of the 111th Engineers, U. S. A., recently returned from active service in France and is now associated with Frank D. Chase, Inc., Chicago, in the capacity of engineer in charge of work for the General Motors Corporation at Janesville, Wis. He was graduated from Northwestern University and later from the Massachusetts Institute of Technology. He was engaged for several years in railroad work and from 1906 to 1917 held various posi-

tions as engineer with the city of Chicago, having been assistant city engineer for the last six years of that period. In 1917 he went into the army as captain of engineers. Then he had charge of Camp Bowie, Fort Worth, Tex., as constructing quartermaster. When this was finished, he was made lieutenant-colonel and was assigned to the 111th Engineers. He was made a colonel in September, 1918, and saw service in St. Mihiel and the Argonne.

C. A. Ducharme has been transferred from the Philadelphia sales office of the Republic Iron & Steel Co. to the Boston office.

Harry M. Spitzenberg, assistant chief inspector Government Bureau of Aircraft Production, New York, has become associate editor of the *Inspector*, the new magazine published by the American Society of Mechanical Inspectors.

J. W. Heltzel, principal owner of the Heltzel Steel Form & Iron Co., Warren, Ohio, has formed the Ohio Structural Steel Co., capital \$75,000. The new company will operate a works at Newton Falls, Ohio.

Ralph S. Gildart, formerly advertising manager P. B. Yates Machine Co., Beloit, Wis., has joined the Kelvinator Corporation, Detroit, manufacturer of mechanical refrigerating units, in a similar capacity.

A. W. Lau of the A. W. Lau Iron Co., fabricator, Youngstown, Ohio, has opened a branch shop in Akron, Ohio, to take care of Summit County business.

R. R. Shafter has returned to the sales organization of Traylor Engineering & Mfg. Co., mining, milling, crushing and smelting equipment, Allentown, Pa., after an absence of two years as general superintendent of the Traylor Shipbuilding Corporation. Mr. Shafter as district manager will have charge of the New York office at 30 Church Street.

D. B. Stokes, Eastern sales manager of the United States Cast Iron Pipe & Foundry Co., Philadelphia, has been appointed Western sales manager at Chicago, succeeding A. J. Goodhue, who becomes Western sales manager emeritus, effective Aug. 1. W. C. Savage, assistant Western sales manager, has been appointed Eastern sales manager at Philadelphia.

Changes have been made among officials of the Diamond Coal & Coke Co., recently taken over by the Hillman Coal & Coke Co., Pittsburgh. The new organization is as follows: T. W. Guthrie, president; A. B. Sheets, first vice-president; A. R. Budd, second vice-president; A. H. Stolzenbach, secretary and treasurer; R. W. Flenniken, assistant treasurer, and Thomas Watson, assistant secretary.

Frank O. Leitzell has been added to the corps of engineers of sales in the sheet and tin mill specialties department of the Blaw-Knox Co., Pittsburgh. Mr. Leitzell is a graduate of Pennsylvania State College, and before going with the Blaw-Knox Co. was assistant to the general manager of the H. K. Porter Co., Pittsburgh, builder of light locomotives.

R. C. Alger is in charge of the office which the Fort Wayne Engineering & Mfg. Co., Fort Wayne, Ind., has established at room 1515, 30 Church Street, New York.

The Grinding Process Tool Co. is the new name adopted by the corporation known heretofore as the Detroit Reamer Salvage Co., Detroit, which commenced business about six years ago re-manufacturing worn out reamers. The business has since been expanded to take in all kinds of precision metal cutting tools. The process, as now developed, covers the thorough re-manufacture of the old tools into new ones of smaller sizes. The capital has been substantially increased. Ray G. Lambe is sales manager, S. A. Cogsdill, president and W. W. Blakely, secretary-treasurer.

The Bethlehem Steel Co., Sparrows Point, Md., has donated a large tract of land to be used as an aviation field and the Air Service Club of Maryland will soon make plans for the construction of hangars and buildings.

OBITUARY

H. H. Roberts

Henry H. Roberts, Philadelphia manager of THE IRON AGE, died Saturday, July 26, at his summer home, 46 South Sovereign Avenue, Atlantic City, N. J. The funeral was held Tuesday morning at Atlantic City and interment was at Mt. Moriah Cemetery, West Philadelphia, Tuesday afternoon.

Mr. Roberts was born in Philadelphia. He had the misfortune in childhood to lose his father, and the burden of supporting a large family being too heavy for the widow, she placed Henry in Girard College for orphans. He remained there for several years, finishing the prescribed course. After a period of intermittent employment with mercantile houses, the young man's brightness attracted the attention of Thomas Hobson, then Philadelphia business manager of THE IRON AGE, who engaged him as an assistant. In this capacity Mr. Roberts served for several years, developing marked aptness in increasing the advertising business of the Philadelphia office.

About 1890 THE IRON AGE established a branch office in St. Louis. After two years' service the manager resigned to take a more lucrative position, and at the suggestion of Mr. Hobson, Mr. Roberts was appointed to fill the vacancy. From the time he took charge of the St. Louis office its business sharply grew and he distinguished himself by securing advertising contracts which ranked high among the record breakers of that period. About 1896 the Chicago manager, J. K. Hanes, suffered a nervous breakdown, necessitating his temporary retirement and the proved ability of Mr. Roberts caused him to be placed in charge of both the Chicago and St. Louis offices. The increased labors and greater responsibilities in his larger field simply gave him the opportunity to display his business ability to better advantage, and when in 1897 it was found that the recovery of Mr. Hanes was hopeless, Mr. Roberts was appointed Chicago manager, James Newell succeeding him at St. Louis.

Although Mr. Roberts's administration of the affairs of the Chicago office was eminently successful, its record under his management far exceeding what had been accomplished by his predecessors, a yearning for his native city caused him to apply for a transfer to Philadelphia, when a vacancy occurred there in May, 1905, through the retirement of Thomas Hobson. Differences with the then management of THE IRON AGE led to the severance of this relationship in the following year. For a time Mr. Roberts was engaged in a private enterprise of his own, but the call of the publishing field again came to him and he became advertising manager of the *Hardware Reporter*, St. Louis, continuing until the absorption of that paper by *Hardware Age* in 1913, when he was again placed in charge of the Philadelphia office of THE IRON AGE.

Mr. Roberts was active in church work and in community affairs and was a prominent member of the Manufacturers' Club of Philadelphia. He leaves a



HENRY H. ROBERTS

widow, two daughters and a son, Henry H., Jr., who only recently returned from extended service with the American Expeditionary Forces.

EDWARD DOUD, builder and operator of various blast furnaces in the South, died at Allen's Creek, Tenn., July 21, aged 84. He was a native of Vermont and a graduate of Middlebury Academy in civil engineering. After spending several years surveying on the Minnesota frontier, he moved to Chattanooga, Tenn., in 1873, where he became connected with the Chattanooga Iron Co. Later he built the Sewanee furnace at Cowan, Tenn., and in 1883 the Citico furnace, Chattanooga, of which he became treasurer and general manager in 1884. Besides these furnaces, which were among the first coke furnaces in the South, he built and operated plants at Sheffield, Ala., Poughkeepsie, N. Y., Midland and Hamilton, Canada. He retired from active work in 1900.

CLARENCE W. HATHAWAY, metallurgist for the last eight years for the Granite City Steel Works branch of the National Enameling & Stamping Co., drowned while swimming with a party of friends in the Mississippi River on July 19 at Granite City, Ill. He was born in Columbus, Ohio, in 1886, and was educated at the Ohio State University. He had been employed with the United States Steel Corporation at Gary, Ind., before accepting his last position. He was a member of the American Chemical Society, Metallurgical Society of America, and the American Ceramic Society.

WILLIAM ALTHOFF, president Twentieth Century Brass Works, Belleville, Ill., died July 23 after a week's illness. He was one of the founders of the Eagle Foundry and the St. Clair Foundry and a trustee of St. Paul's Evangelical Church. He is survived by one daughter, Mrs. Anna Lengfelder, wife of Henry Lengfelder, president Orbon Stove & Range Co.

GEN. WILLIAM EMIL DOSTER, for 35 years counsel for the Bethlehem Steel Co., and its predecessor, the Bethlehem Iron Co., and connected with many other corporations, died at Bethlehem, Pa., July 2, aged 82 years.

Patent rights have been taken out in France by P. L. Weston (No. 487,380) to cover the use of thin steel or iron belts on magnetized pulleys to transmit power. The magnetization of the pulleys is effected by windings lying in helicoidal slots on the surface of the pulleys. The thickness of the belt should not exceed about 0.06 times the diameter of the smallest pulley. With a steel belt of 1/6-in. thickness making contact over an arc of 145 deg. on a pulley of 10 in. diameter running at 4000 r.p.m., it is possible to transmit more than 200 hp. per in. width of belt. With a pulley of 50 in. diameter running at 800 r.p.m., a belt of 1 in. width will transmit 1000 hp. Steel belts may be run at speeds of 18,000 ft. per min. so that this method of transmission is suitable for speed reduction with turbines.

The number of blast furnaces in operation in Lorraine at the beginning of the Armistice was 68. In the middle of April the scarcity of coke reduced the number in service to 26, and a further decrease to 12 furnaces took place in May, the coke being supplied from the left bank of the Rhine and from Belgium. It is now [June] stated that the coke problem has brought to a stoppage the Thyssen Works at Hagendingen, the Rombach ironworks at Rombach, and the Aumetz-Friede Works at Kneuttingen.

The first issue of a new magazine to be published by employees of the Youngstown Sheet & Tube Co. will appear August 15, with a circulation of 15,000 copies. R. J. Kaylor, publicity director, is editor and has a staff of 37 reporters to represent all departments.

"A Study of the Goutal Method for Determining Carbon Monoxide and Carbon Dioxide in Steels," is the title of Technological Paper No. 126 of the U. S. Bureau of Standards. The authors are J. R. Cain, chemist, and Earl Pettijohn, assistant chemist.

ROADBUILDING MACHINERY

Equipment Needed by the States—War Department's Available Surplus Supplies

WASHINGTON, July 28.—The Department of Agriculture has made a report to the Senate of the war materials and equipment which are being turned over to the States for highway construction.

By the Postoffice Appropriation law for 1920 Congress authorizes this disposition of surplus, and the distribution is still in progress. The officials of the Department of Agriculture canvassed carefully the needs of the various States and submitted the results to Secretary Baker. He in turn has promised to deliver, in addition to road-building machines, the following items for this purpose from the department's surplus: 700 concrete mixers, 125 derricks, 30 to 60-ft. boom, 100 pile-driver outfits complete, 200 complete air-drill outfits, 250 steam pumps, up to 4 in., 150 centrifugal pumps, up to 4 in., with power, 75 diaphragm pumps, gasoline driven, 200 clamshell, orange peel and bottom-dump buckets, 160 automotive cranes, 3600 trailers for tractors, 1000 miles industrial railway track, 200 industrial railway locomotives, 3500 industrial railway dump cars, 200 steam shovels, capacity 1 yd. or less, 250 conveyors, gravity and power, 35 donkey, 200 hoisting and 75 gasoline engines, 5 to 30 hp., 375 complete steam-drill outfits, 250 portable air-compressor outfits with power, 100 boilers, 15 to 40 hp., 275 electric motors, 2 to 50 hp., 1300 pulley blocks, 10 dredges, 100,000 ft. hoisting cable from 1/4 to 1 in., 10,000 ft. air hose, 100,000 ft. manila rope, 1 1/2 to 2 in.

The final requirements of the States, however, says the report of the Department of Agriculture are likely to exceed this schedule. The department's list of probable construction requirements also includes the following items: 40,000 linear ft. steel forms for concrete construction, 120 carloads corrugated metal culvert, 150 miles of steel or iron pipe from 1/2 to 3 in. in diameter, with fittings, 1186 tons structural steel, 10,000 tons reinforcing steel, 16,000 tons sheet-metal roofing, 2000 tons wire fencing, 50 tons nails, 35 tons spikes, 20 tons bolts, 10 tons nuts, threaded, 56,025 linear ft. cast-iron culvert pipe, 12 to 36 in. in diameter, 2000 miles telephone wire, 4404 a-speed trailers for trucks.

The State requirements for machine tools and similar items follow:

- 15 complete machine-shop outfits, including lathes, drills, planers, fittings, etc.
- 3 swing engine lathes, 14 in. to 20 in.
- 3 end milling machines
- 3 planers
- 4 power punches
- 3 shapers
- 4 power shears
- 3 shop screw presses, 25 tons capacity
- 12 complete sets pipe dies, from 3 in. down
- 12 complete sets taps and dies for bolts and nuts
- 552 complete sets of blacksmith outfits, with forges, anvils, and accessories
- 306 complete sets carpenter tools and chests
- 11 complete wood-working outfits, including lathes, saws, planers, fittings and accessories
- 12 boring machines
- 30 wheelwright outfits, complete
- 10 tire setters
- 10 farriers' outfits, complete
- 6 diving outfits, complete, with pumps

The following list of general supplies has also been made up of the estimated needs of the various States:

- | | |
|--|--------------------------------------|
| 100 sets shelf and heavy hardware supplies | 63,000 shovels |
| 4,200 axes, with handles | 2,000 spades |
| 1,600 axe handles | 1,260 crosscut saws |
| 1,680 adzes | 475 monkey wrenches |
| 1,200 brush hooks | 475 mason's trowels |
| 1,900 crowbars | 475 saw-filing outfits |
| 1,080 cant hooks | 12,677 lanterns |
| 300 grindstones | 100 acetylene camp lights |
| 240 carborundum grinders | 600 paint brushes |
| 1,000 hammers, assorted sizes | 120 wire brushes |
| 100 riveting hammers | 100 tons drill steel |
| 2,130 striking hammers | 10 tons horseshoes |
| 5,265 hatchets | 10 tons mule shoes |
| 574 B. P. machinist hammers | 1 ton horseshoe nails |
| 2,100 shovel handles | 10 tons solid drill steel |
| 7,050 pick handles | 1/4, 3/8 and 1 in. |
| 920 sledge handles | 10 tons hollow drill steel |
| 13,300 picks | 3/8, 1/2 and 1 in. diameter |
| 28,866 mattocks | 6,000 lb. axle steel, assorted sizes |
| 950 drills | 6,000 lb. tire steel, assorted sizes |
| 650 drill bits | 1,679 log chains |

THE DUTCH EAST INDIES

Present and Future Needs in Iron and Steel— American Opportunity Outlined

BY J. W. EVANS*

Thirty per cent of the 20 million dollars' worth of exports that went from the United States to the Dutch East Indies in 1918 consisted of steel and iron products, ranging from the commonest household utensils to the greatest machines. Last March, for instance, we sent them 15,000 kegs of wire nails. A few months later the colonial government placed an order for 12 locomotives at a total cost of \$600,000.

Our 20 million dollar export trade with them in 1918 was eight times what we sent them in 1915. Their 80 million dollars' worth of exportation to us was 16 times the figures of 1913.

Of course it all came about from the war. We had always gotten their products, such as coprah, tea, coffee, rubber and quinine by way of Europe and paid the European middleman a commission for the privilege. But the war forced direct trade and forced them to buy from us the manufactured products for which they had always looked to Europe.

It is now simply a question of how much of this trade we are going to hang on to. And since nearly a third of it is in iron and steel, the outcome is largely in the hands of American makers of iron and steel articles.

It should be understood that the Dutch East Indies do not want all of their trade to go back to Europe. They like American-made goods, and if American manufacturers and American banks will make it possible for them to buy on reasonable credit instead of exclusively for cash, as was the case during the war, they will stay with us. All we have to do is meet them considerably less than half way.

Present Activities

Certain facts stand out for men interested in iron, steel and machinery. The railroads, which are government owned, are being extended steadily, the new roads being built with the earnings of the old. The demand for rails, locomotives, general equipment and machine tools for the shops is therefore a steady and growing demand. The number of oil and sugar mills is constantly on the increase, with a consequent demand for all the kinds of machinery necessary to them. There are 211 sugar mills in Java, with an average capacity of 600 tons per factory. There are 250 coffee estates, most of them using machinery. There are 200 tea factories, some with an annual output of a million pounds. Also there are many ice factories, rice mills, machine shops, dock yards, steamship lines, etc.—all demanding machinery.

The standards of living are going up. Three cities in Java, for instance, are now in the market for 47,000 tons of iron and steel piping for installing water systems. This is for the mains alone and takes no account of the supplies needed for their branches. Nor does it take count of other projects of a similar nature now under way in other towns.

A \$4,000,000 harbor is being constructed at Bilawan, Sumatra, to open up the tobacco and the rubber country and make it possible for ships to come there for direct loading. The construction of concrete warehouses and quays means thousands of tons of steel for reinforcement—not to mention the installation of harbor terminal machinery and equipment later. And on top of that, the opening of the great interior of Sumatra to direct commerce with the world is a promise for the growth of general markets there and of a demand for every kind of construction material.

Developments of the Future

The next few years are likely also to see the opening up and development, either by the colonial govern-

ment or by firms with government affiliations, of large deposits of iron, nickel, manganese and chromium in Celebes. It is reckoned at a billion tons. It comes close to the surface and can be worked by developing water power at the outlet of three lakes in that region.

This is certain to come about before long. It means that the government will build a railroad to the interior of Celebes and bring in Javanese from overcrowded Java to develop the country agriculturally with rubber, coprah, tobacco, etc. Electrical machinery, railway machinery, mining machinery, together with every sort of accessory and supply, will certainly be in demand there on a big scale. There is, moreover, the prospect that the mines will bring industrial plants to that region, and there will be a standing invitation to capital. The men who will sell in that market will be the men who have the foresight to establish themselves and their brands and their reputations in the Dutch East Indies now. Those are the men who will be let in on the ground floor. Those who come later will take what they can get. Nor should it be forgotten that Europe, past master of foreign trade and long established in that field, will shortly be in the running again. Now is the time for us, while we can get an uninterrupted hearing.

As a field for the manufacturer the Dutch East Indies also offer certain special advantages over many other possible fields for foreign trade. One important thing is the exceedingly friendly and liberal attitude of the colonial government. A man can build up a trade in the settled conditions of that region with the certainty that he will have most adequate protection and that his rights will not be infringed upon, either by the government or any one else. And for the same reason men with capital to invest can go there with assurance that they are safe.

Trade Commissioner Sent to United States

The colonial government has recently taken a step which will do much to bring this whole matter definitely to the attention of American business. It has sent as special trade commissioner to this country its foremost financier and commercial authority, K. F. van den Berg, managing director of the Bank of Java. Mr. van den Berg's mission is to bring about a clearer understanding in this country of the field offered for our commerce by the Dutch East and the need for such adjustments in our banking system as will make it possible for merchants in the Dutch East to buy from us on credit as they have always done with Europe. Mr. van den Berg has succeeded in making one thing clear; and that is the fact that American business men cannot afford not to give the Dutch East Indies a careful study.

Large Rolling Mill Contracts

The Mesta Machine Co., Pittsburgh, has recently taken some large work for steel plants. One contract placed by the Weirton Steel Co., Weirton, W. Va., is for a 40-in. two-high blooming mill with tables, manipulator, transfer and other accessories; 600-ton motor-driven shear with three gears, capable of cutting 14-in. x 14-in. blooms; also a motor-driven 300-ton crop shear, a 600-ton billet shear, ingot buggies and other small equipment. From the Cambria Steel Co., Johnstown, Pa., the Mesta Machine Co. has received a contract for two 48 x 84 x 84 x 60-in. steam blowing engines, these being similar to four engines installed at this plant by the Mesta Machine Co. some time ago. The Tata Iron & Steel Co., Sakchi, India, has placed orders with the same builders for two 24 x 52 x 36-in. blowing engines, and the Pittsburgh Crucible Steel Co., Midland, Pa., a 42 x 84 x 60-in. steam blowing engine.

"Preparation of Manganese Ore," by W. R. Crane has recently been issued as No. 17 of the Minerals Investigations Series of the U. S. Bureau of Mines. It embodies the results of the work of the Bureau's engineers who were sent into the field during the war to advise operators as to the proper methods of mining and of treating ores.

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MAGNESITE SITUATION

Production in United States—Conditions Bearing on Duty Free Imports

WASHINGTON, July 28.—The magnesite cost in steel production in the United States was cut 50 per cent through war economies, according to a report on "The Present Situation in the Magnesite Industry," by W. C. Phalen of the Bureau of Mines. Most of the document is devoted to the development of the American magnesite industry, with particular attention to the work which has been done to make this country independent of foreign production. The following is taken from the report:

"The topic of paramount importance and interest in the domestic magnesite industry at present time is whether foreign magnesite, chiefly from Austria, is to come in free of duty.

"The United States is considered to be the largest consumer of magnesite in the world, as it is the foremost steel producing nation and there is tendency to require the best material in its manufacturing processes. In this connection it should be pointed out that dead-burned dolomite has been used as a substitute for magnesite and that the Canadian magnesite, which is high in lime and which approaches dolomite in composition, has also been treated and used as a substitute. The consumption of crude magnesite in the world is estimated at 500,000 tons, and of this the United States consumes about 70 per cent. Before the war approximately 96 per cent of the material used in the United States was imported and of the imported material 95 per cent came from Austria, taking the average for the few years just prior to the war.

"The most important deposits of magnesite in the world, outside of the United States, are in Austria and Greece. The Austrian material is crystalline and in this respect it is comparable with the Stevens County, Wash., magnesite. The Grecian material is amorphous and more nearly like that of California. The supplies of magnesite in Austria are very large and the reserves in Greece are also of importance.

"In the case of Austria, some of the most important deposits are within 100 miles of the coast; while those of Greece are in part on the seacoast. These conditions reduce transportation costs to the minimum. Other sources of magnesite which have been used in this country are Venezuela, Lower California (Mexico) and Canada. The Canadian material is high in lime but before being used in the furnace is treated to render the lime as unobjectionable as possible.

United States Magnesite Supplies

"Magnesite in California is found in veins which vary considerably in length and thickness. This irregu-

larity of occurrence adds to cost of mining as compared with the Grecian material. In Washington it occurs in massive beds and the methods of extraction employed are quarrying, rather than mining, though tunnels are run. The reserves in Washington are of great magnitude; while those in California are not so great, they are of great extent at several properties.

"If the annual consumption of magnesite in the United States be taken as 350,000 tons of crude, our domestic supplies would last a generation and there is always the possibility that new discoveries will be made and thus extend the life of the industry.

"No deposits are pure and the material has to be selected, but in this respect the domestic mineral is no different from the foreign.

The capacity of the calcining plants of California is estimated at 350 to 400 tons daily, or 10,000 to 12,000 tons monthly. In Washington, considering one plant alone, the Northwest Magnesite Co., there is calcining capacity of 10,000 tons per month, making in all a capacity of 20,000 tons per month, or 240,000 tons per year, which is far more than ample for the needs of the United States.

"Prior to the war, between 6 and 14 lb. of magnesite was used per ton of steel, according to estimates of several prominent Eastern steel manufacturers. The quantity used was cut in half during the war, owing to a greater measure of economy and the substitution for magnesite of dead-burned dolomite. About 3 to 7 lb. or an average of 5 lb. per ton of steel was used during 1917, which quantity may be considered approximately that now used. Thus, it will be seen that the quantity of magnesite now consumed per ton of steel is only 50 per cent of what it was during the war.

"The cost of magnesite per ton of steel is small; and this spring with the price of magnesite brick at \$450 per thousand and with grain magnesite at Chester, Pa., at \$48.50 per ton, the cost of magnesite per ton of steel on the basis of all brick was about 22½c., and on the basis of grain magnesite, 12½c. The cost of magnesite per ton of steel must lie somewhere between these limits and assuming the use of half brick and half grain, would not be far from 17c. to 18c., under the prices which prevailed this spring. On the basis of two-thirds brick and one-third grain the cost would be about 19c. These prices have been abnormally high and it is probable that 8c. or 9c. a ton of steel is nearer the truth for normal pre-war conditions; but with greater economy in the use of magnesite and especially in the use of dead-burned grain and the substitution therefor of dead-burned dolomite has tended to offset the higher war prices."

The report gives details concerning each of the large producing companies in the United States.

O. F. S.

Conference with Sheet Jobbers

A conference will be held in the near future between a committee from the Metal Branch of the National Hardware Association and a committee of the National Association of Sheet and Tin Plate Manufacturers regarding methods of distributing black and galvanized sheets. The jobbers' committee consists of F. O. Schoedinger, Columbus, Ohio; F. J. McNieve, W. F. Potts Son & Co., Philadelphia, and J. George Fuchs, Bruce & Cook, New York. On behalf of the National Association of Sheet and Tin Plate Manufacturers the following committee has been appointed: E. T. Sproull, Trumbull Steel Co., Warren, Ohio; G. T. Thomas, Canton Sheet Steel Co., Canton, Ohio, and F. A. Moeschl, Newport Rolling Mills Co., Newport, Ky.

The Dayton Engineering Laboratories, Dayton, Ohio, will install an electric furnace for melting and refining aluminum. This furnace has been shipped by the Electric Furnace Co., Alliance, Ohio. It has a hearth capacity of 500 lb. and a melting rate of 200 lb. of aluminum per hour. It is equipped with a double charging door in the front and rear and otherwise is similar to the standard Baily electric furnace of 105 kw. electrical capacity and 1500 lb. hearth capacity.

Alloy of Uranium and Aluminum

An alloy of aluminum and uranium is covered by a patent (U. S. 1,304,224, May 20, 1919) granted to L. F. Vogt, Washington, Pa., and assigned to the Standard Chemical Co. of that city. The new alloy contains from 0.50 to 2 per cent of uranium and is said to possess unusual strength and toughness. The patentee claims that the addition of uranium to aluminum and aluminum alloys imparts properties to an extent that cannot otherwise be obtained and that its effect on the microstructure is favorable.

Publication of Autogenous Welding, the monthly bulletin of the Davis-Bournonville Co., Jersey City, N. J., which was suspended during the war, has been resumed. The July issue, known as the victory number, is largely devoted to the part played by oxy-acetylene welding and cutting in the war.

The Slick-Knox Steel Co., Wheatland, Pa., has awarded a contract to the McClintic-Marshall Co., Pittsburgh for a power house and machine shop 70 x 250 ft. A two-story brick office building is also to be erected at Wheatland to cost \$35,000.

GOVERNMENT OFFERINGS

Sales of War Material Bring \$354,500,000, Or 78 Per Cent of Cost

WASHINGTON, July 29.—A quantity of sheet steel and scrap, costing the War Department \$313.13, was sold for \$2,196.67, or 702 per cent of the original cost. A small lot of brass, for which the sum of \$113.63 was paid, was sold by the Signal Corps for \$555.50, or 491 per cent of the cost price. These are two little items to which the office of the director of sales of the War Department points with pride in the record of sales of surplus during the week ended July 18.

The total realized from the sales of surplus war materials during that week was \$1,674,892.17, bringing the total from Jan. 1 to July 18 up to \$354,470,243.03, which sum represented a recovery by the Government of 78 per cent of the original cost of the materials sold.

The War Department is trying to sell its barbed wire surplus direct to the stock men of the country. The director of sales of the surplus property division is offering for sale, under sealed proposals, 1930.2 tons of black painted barbed wire and 1464.5 tons galvanized barbed wire, bids to be opened at 10 a.m. Sept. 3 in the office of the chief of its surplus property division, Munitions Building, Washington. This wire is the standard commercial heavy barbed wire. It is the No. 12 gage type with 13 gage points located 3 in. apart. The barbs have four points, each ½-in. in length. Both the black and galvanized wire weighs approximately 1/10 lb. to the running ft. The wire is stored in Government warehouses at Columbus, Ohio.

Sealed bids on the following materials will be opened at 2.30 p.m., Aug. 1, by the Philadelphia District Salvage Board, 1710 Market Street: About 6¼ tons strip brass, in coils, 5¼ x .010 in., at the International Fabricating Corporation, Wilkes-Barre, Pa.; about 1434 tons, 143,413 pieces, McFarlane forgings for 75-mm. shells, at Worthington Pump & Machinery Corporation, Hazelton, Pa. Bids are open until 2 p.m., Aug. 6, on: 607,380 lb. 75-mm. shell forgings, at Roberts Filter Mfg. Co., Frankford, Philadelphia, and 4572 lb., partially machined. At 2.30 p.m., Aug. 4, 4000 pieces of 9.2-in. shell forgings, William Wharton, Jr., & Co., Easton, Pa.; 27 tons 0.360 x 0.390-in. steel bars, cold drawn screw stock, United States Eddystone Rifle Storage Arsenal, Eddystone, Pa.; at 2 p.m., Aug. 5: 100,714 75-mm. shell forgings at the Worthington plant at Hazelton, Pa., and approximately 62,186 lb. 42-lb. pigs of nickel, at Standard Steel Works, Burnham, Pa.

Until 11.30 a.m., Aug. 6, bids will be accepted on approximately 715 tons, 1½ x 1¼ in. x 15 ft., rectangular bar stock, hot rolled steel, located United States Eddystone Rifle Storage Arsenal, Eddystone, Pa.

The Pittsburgh office, Chamber of Commerce Building, offers 1475 tons 5-in. square shell steel billets, 5 to 7 ft., at Allegheny Steel Co., Breckenridge, Pa., and 21,000 tons 3 to 10 ft. long, at Pressed Steel Car Co., McKees Rocks, Pa., and Neville Island. This office also offers 76 tons of 155-mm. howitzer recuperator forgings, at Mesta Machine Co., Homestead, Pa., and 15 tons at National Transit Pump Co., Oil City, Pa. Bids will be accepted on these lots until 11 a.m., Aug. 8.

The Rochester, N. Y., office, 82 Paul Street, offers until noon, Aug. 11, the following, located at the Atlas Steel Casting Co., Buffalo, 324 tons cold-rolled screw stock, 2½ in. x 10 to 12 ft. Also items of 17/32 in., 0.288 in. and 1¼ in., same stock, and 832 bars, 2/8 x 2 in. x 13 ft. hot-rolled forging steel, are offered. Located at the Remington-Union, N. Y., works, are about 74 tons ½-in. and ¾-in. square carbon steel, and about 1,144,669 lb. of round, flat and square screw stock steel.

The Detroit, Mich., office, 932 Book Building, accepts proposals until 11 a.m., Aug. 1, on 25,063 pieces 10-in. base plug forgings, approximately 475 tons, located at American Car & Foundry Co., Detroit.

The Bridgeport, Conn., office, Liberty Building,

accepts bids until 1.30 p.m., Aug. 4, on the following, located at Wire Wheel Corporation, East Springfield, Mass.: 69,998 lb. bar stock, 1 x 9/16 in. x 5 ft.; 121,101 lb. chrome nickel, 1.82 in. round; four lots of 357,355 lb. cold-rolled steel, ¾ in. x 12 ft.; 34,420 shell forgings. For the same date this office offers at Whiting Mfg. Co., Bridgeport, Conn., two lots of 343,425 lb. hot-rolled steel, 2 in. x 10-12 ft., and one lot of 8280 lb. 2 in. x 18-24 in. At the Corbin Screw Co., New Britain, Conn., are offered three lots of 356,919 lb. cold-rolled steel rod, 1½ in. x 12 ft. Located at Turner & Seymour Mfg. Co., Torrington, Conn., is 16,617 lb. cold-rolled steel 2½ in. x 0.050 in. At the American Tube & Stamping Co., Bridgeport, Conn., is a lot of 62,336 lb. cold-rolled steel, 4 x 0.028 in. At the Bulard Engineering Works, Bridgeport, are 11,574 lb. No. 2 steel, ¾ in. x 5 ft. 3 in. (average). At the Russell & Erwin Co., New Britain, Conn., is a lot of 18,850 lb. cold-rolled sheet steel, basic open hearth steel slabs, 6¼ in. x 0.025 in., 36,890 lb. 3¼ x .047 in., 29,189 lb. 3¼ in. x 0.030 in.

Sealed proposals will be received up to 11 a. m. Aug. 6, at the Detroit district ordnance office, Committee on Sale of Materials, 932 Book Building, Detroit, for the sale of approximately 1,171,213 lb. sheet steel, as follows: Item 1: 34 sheets 9/32 x 23 x 46 in. pickled and lime sheet, 2878 lb., furnished by Sharon Steel Hoop Co., extra deep drawing; item 2: 4281 sheets 9/32 x 23 x 69 in. pickled and lime sheet steel, furnished by Sharon Steel Hoop Co., approximate weight 540,476 lb., extra deep drawing; item 3: 4971 sheets 9/32 x 23 x 69 in. hot-rolled extra deep drawn sheet steel, 627,859 lb., furnished by La Belle Iron Works. Bids will be accepted on lots of 100 tons or all.

The St. Louis office, Fifteenth and Locust Streets, is accepting sealed proposals until 11 a. m., Aug. 7, on approximately 1524 tons of 8-in. square shell billets, 2 ft. to 8 ft. long, at Curtis & Co. Mfg. Co., St. Louis, Mo. Until 11 a.m. Aug. 5, sealed bids will be received on 382 tons, 1558 ingots for 9.5-in. forgings, approximately 540 lb. each, located at American Steel Foundries, East St. Louis, Ill. Bids will be opened at 10 a.m., Aug. 7, on 153 tons 8-in. shell billets, 24 in. long, at Curtis & Co. Mfg. Co., St. Louis, Mo. Sealed proposals will be opened at 11 a.m., Aug. 6 on approximately 444 tons of 8-in. shell forgings, approximate weight 330 lb. each, located at the Curtis plant.

The New York office, 1107 Broadway, offers until 11 a. m., Aug. 1, 4927 lb. carbon crucible steel, ½ in. sq., 12 ft. long; 19,814 lb., ¾ in. sq.; 19,795 lb., 1 in. sq.; 19,831 lb., 1¼ in. sq.; 19,829 lb., 1½ in. sq.; 9949 lb., 2 in. sq., etc. All lots are at Heller Brothers, 879 Mount Prospect Avenue, Newark, N. J.

To Improve St. Louis Shipping Facilities

ST. LOUIS, July 26.—The Board of Aldermen of this city has authorized the expenditure of \$300,000 for the completion of additional units of the municipal dock at the foot of North Market Street, the purchase of additional freight-handling equipment and the construction of warehouses.

W. H. Smith, superintendent of the municipal docks, states that a number of steel manufacturers have conferred with him with a view to making Southern shipments by way of the Federal barge lines. The first of the new 2000-ton steel barges arrived in St. Louis this week and others will follow until 40 barges and five towboats are put in commission. Three fleets will leave St. Louis each week for Southern ports.

Work on the additional dock units will commence 30 days after the signature of the improvement bill by Mayor Kiel. The underwater foundations of the two docks are already in. A warehouse 400 by 200 ft. will be erected and an existing small warehouse will be enlarged. Approximately 1000 tons of freight can be handled over the docks daily, when completed.

The Asia Banking Corporation, 35 Broadway, New York, has issued for general distribution a booklet containing a draft of China's revised tariff.

LORRAINE ORE TO GERMANY

Will France Consent to Such Shipments in Exchange for Coke?

Abraham Berglund, of the staff of the Tariff Commission at Washington, is the author of a pamphlet on "The Iron Ore Problem of Lorraine," which is a reprint from the *Quarterly Journal of Economics* published by Harvard University. The author gives at the outset some of the familiar facts concerning the extent of the minette iron ore deposits in Lorraine. Being in possession of what has been German Lorraine, France will now have iron ore deposits in the Lorraine field amounting to 5,330,000,000 tons, capable of yielding 1,755,000,000 tons of pig iron. The iron ore reserves of German Lorraine (2,330,000,000 tons) constituted nearly two-thirds of the proved deposits of the German Empire, while those of French Lorraine (3,000,000,000 tons) were over 90 per cent of the estimated total of France. The results of the redistribution left the ore supplies of the two countries as follows:

France, Metric Tons	Before the War	Germany, Metric Tons
	After the War	
3,300,000,000		3,607,700,000
5,630,000,000		1,277,000,000

The proved iron ore reserves of all Europe as computed in 1910 were 12,031,900,000 tons, with an equivalent metallic content of 4,732,800,000 metric tons. The supplies of France, therefore, as a consequence of the war are over 45 per cent of the estimated actual iron ore reserves of Europe and over 40 per cent of their iron content. Just before the war the Lorraine field was supplying Europe with an annual ore tonnage of between 45 and 50 millions. That is, in 1913 the iron ore production of Germany, excluding Luxemburg, was 26,771,598 tons. Of this 21,135,554 tons was mined in Lorraine. Adding the ore production of Luxemburg, 7,332,000 tons, gives a total for the Luxemburg-Lorraine district of nearly 28,500,000 tons, and for the territory in the German Customs Union of over 34,000,000 tons. France in 1913 produced 21,572,835 tons of iron ore, of which over 90 per cent was produced in French-Lorraine in the districts of Briey, Nancy and Longwy.

The pamphlet points out that in 1913 Germany imported over 14,000,000 tons of ore, of which 4,558,000 tons came from Sweden, 3,811,000 tons from France and 3,632,000 tons from Spain. Germany produced 19,291,920 tons of pig iron in 1913 against only 5,311,316 tons in France. Germany's production of steel in the same year was 18,958,819 tons and that of France only 4,419,241 tons. Thus France, with an iron ore production equal to about two-thirds that of Germany (including Luxemburg), and iron ore reserves nearly as great as Germany's, had a pig iron output considerably less than one-third and a steel output of less than one-fourth.

The author takes up the expectation expressed by many French writers and statesmen that there will now be a development of the iron and steel industry in France corresponding to its wonderful growth in Germany in the pre-war period. He asks whether these expectations, apparently based on Lorraine ore, are justified. The coal and coke consumption of France far exceed her production. Fuel has been high in France, and the high fuel prices have affected iron and steel costs and limited the competitive strength of the French iron and steel industry. The author takes up the demand of France for the cession to her by Germany of the coal deposits in the Saar basin, which demand has finally found a place in the Peace Treaty. He holds that the Saar district, while containing large coal deposits, only meets the situation partially. Its resources are not commensurate with the enormous demand which would be made upon it in the event of such a growth in the French iron and steel industry as is anticipated by certain French writers. The coke production of the district is neither large nor high in

quality. The situation after the war will depend very largely on the policy adopted by France with regard to the exportation of iron ore to Germany. "If iron ore no longer moves from Lorraine to the Rhenish-Westphalia and Saar districts (assuming that the latter remains a part of German territory) the backbone of the present German iron and steel industry will be broken." The author suggests that there may be an interchange of ore and coke between France and Germany. He recognizes that France will not favor the shipment of Lorraine ore to German iron works, but adds:

The attitude of France with reference to the exportation of iron ore is of course intelligible in the light of the experiences through which she has passed and in the face of exposures like the document above cited. [A plan of the Germans, in the event of a German victory, to take over the French iron mines of Briey and Longwy.—Ed.] It is not to be attributed to commercial particularism, with which France has sometimes been charged. The ambition to make her enormous ore resources serve a home industry rather than the industry which was lately used by a powerful neighbor to despoil her of those resources is laudable from both a patriotic and ethical standpoint. The fact remains, however, that metallurgical processes being what they are and the resources of Continental Europe in ore and coal distributed in the manner above described, the economic feasibility of any taboo on an interchange of ore and coke between France and Germany is, to say the least, very questionable. The iron ore problem of Lorraine, viewed in the light of the present technical processes of iron and steel manufacture, is a good example of how political aspirations and ethnological considerations may come into conflict with an economic situation.

Since Mr. Berglund's article was written the treaty of peace has been published, with its provision that France is to have absolute possession of the coal mines of the Saar basin. There have also been published views of French authorities to the effect that much that has come from German sources as to "the pretended unsuitability of the Saar coke for metallurgical purposes was merely a blind." On the whole there is less warrant for the expectation that France will permit shipments of Lorraine ore into Germany, or for the belief that France will have any such need of Westphalian coke as to entertain any proposal to exchange ore for coke, than existed when Mr. Berglund's article was prepared.

Industrial News of Youngstown

YOUNGSTOWN, OHIO, July 29.—A committee of manufacturers has been appointed to improve housing facilities in the Youngstown, Ohio, district, by the erection of dwellings to be sold to workers in the iron and steel plants on a very nominal down payment and the balance to be deducted from the wages of the purchaser. Included on the committee are James A. Campbell, president Youngstown Sheet & Tube Co.; W. A. Thomas, president, and J. G. Butler, Jr., vice-president, respectively, of the Brier Hill Steel Co.; T. J. Bray, president Republic Iron & Steel Co., and A. E. Adams, president First National Bank and Brier Hill, director of the Brier Hill company. Mr. Campbell announces that the Youngstown Sheet & Tube Co. has expended \$2,000,000 in the last three years in providing housing accommodations for its workers.

Building operations are well under way at the new plant of the Youngstown Pressed Steel Co., on a 40-acre site north of Warren, Ohio. It is expected to begin operation at the new works by Nov. 1. The main building will be 530 x 560 ft., covering practically seven acres, including an unroofed court in the center. It will be of brick, concrete and steel. The plant will be electrically driven. Plants now occupied by the company at East Youngstown and Sharon, Pa., will be used by the Sharon Steel Hoop Co., with which the Youngstown Pressed Steel Co. is affiliated. Output of the new works will be pressed steel parts for automobiles, trucks, tractors, implements and machinery and fireproofing materials such as metal lath, corner beads, expanded metal, steel studding and other special products.

Pittsburgh Basing for Steel Products

Steel Makers Asked to Reply to Complaint of Western Rolled Steel Consumers Prior to Public Hearing About Sept. 1

WASHINGTON, July 29.—Public hearing will be held by the Federal Trade Commission in September on the Pittsburgh basing point controversy. The first question to be settled will be the commission's jurisdiction. The commission has taken formal action on the complaint filed by the Western Association of Rolled Steel Consumers against the United States Steel Corporation and has sent a copy of the complaint with a letter outlining its procedure to E. H. Gary, president American Iron and Steel Institute, and to the United States Chamber of Commerce. At the same time it is planned to send copies to all steel producers, as well as to all other persons interested whose names the commission may be able to secure. It is asking all of these to submit a written statement concerning their position before Sept. 1, 1919. After replies have been received, public hearings are to be held. The commission will also determine at that time how broad its inquiry is to be. The Birmingham, Ala., Chamber of Commerce has already asked to be heard and this request has been granted.

The following is the letter which has been sent to President Gary:

An application has been received from the Western Association of Rolled Steel Consumers for the issuance of a complaint by the Federal Trade Commission against the United States Steel Corporation and others, which alleges that the practice of selling rolled steel on a Pittsburgh basing point basis is repugnant to the Federal Trade Commission Act and to the Clayton Act.

A copy of this application is enclosed herewith.

The Commission is advising you of this matter in order that you may inform members of your organization so that each may determine if he is interested therein.

Additional copies of the application will be sent on request to such members of your organization or other parties as may request it.

It is suggested that you also advise them directly of this matter in order that each may prepare written statements of his position with regard thereto for submission to this Commission. Such statements should be submitted to the Commission before Sept. 1, 1919.

The subsequent procedure in this matter will be as follows: After due opportunity has been given for all interested parties to submit statements to the commission regarding their positions, and other information deemed necessary by the commission has been obtained, public hearings will be held by the Commission, which interested parties are invited to attend, in order to determine whether the application should be granted, or other action taken according to the facts so developed.

The question raised by the applicant may not be the only question involved in this matter and the remedy suggested by the applicant, namely, to make Chicago a basing point may not be the only remedy, or the appropriate remedy even in the event that the applicant's contention is found to be valid. In other words, the whole question of the practice of having basing points for making rolled steel prices may be involved, as well as the question whether Pittsburgh or some other place should be the sole basing point, or whether there should be more than one basing point.

Will you, then, aid the commission's effort to bring notice to all interested parties, by informing your members as above suggested.

By direction of the commission,

Very truly yours,

VICTOR MURDOCK,
Acting Chairman.

Elbert H. Gary, Esq., President American Iron and Steel Institute, 30 Church Street, New York.

Statement of Federal Trade Commission

The Federal Trade Commission also gave out the following statement concerning its action:

The vexed question of a single or plural basing point for steel products was taken up today by the Federal Trade Commission when it received the carefully prepared complaint of

the Western Association of Rolled Steel Consumers. The nominal respondent is the United States Steel Corporation, but every maker and user of steel products is interested in the outcome.

The Federal Trade Commission was urged by both parties of record to take jurisdiction, as the basing point for steel prices had been a bogie in the trade for years. Judge E. H. Gary of the Steel Corporation has said that this action is "the biggest lawsuit ever tried in this country."

The Board of Trade of Superior, Wis., has raised the same question with the Federal Trade Commission and several other complaints have been received. The Chamber of Commerce of Birmingham, Ala., has notified the commission that it desires to be heard. All these complaints will be consolidated into the single proceeding.

A copy of the letter of notification has been sent to many Government departments, including the United States Shipping Board, the United States Railroad Administration, the Post Office Department, the Navy Department, the War Department, the Interstate Commerce Commission and others. It will also go through the American Federation of Labor, to all central labor unions throughout the country.

The application for complaint made by the Western Association of Rolled Steel Consumers says that the membership comprises over 700 fabricators of steel, operating in Illinois, Indiana, Michigan, Wisconsin, Minnesota, Iowa, Kansas, Missouri, Montana, Nebraska, Oklahoma, South Dakota, Texas, Utah, Washington, Wyoming, Colorado and California, all being tributary to what is known as the Chicago district; that the United States Steel mill at Gary produces steel at a cost substantially lower than at the Carnegie plant of the Steel Corporation at Pittsburgh, or at other corporation plants in Pennsylvania; that over one-fifth of the rolled steel made in the United States is made by the respondent at Gary, Ind.

The applicant submits that the normal, reasonable price for rolled steel should be measured by the cost of production with the addition of reasonable profit and without the addition of a large and arbitrary increase which forms no part of the production cost and is over and above such reasonable profit. The applicants declare that despite the fact that steel is made more cheaply at Gary, the complainants are compelled to pay a set price plus a freight rate of \$5.40 per ton from Pittsburgh to Gary, although in fact, the steel is not actually shipped from Pittsburgh at all.

Certain discriminations in price, especially to agricultural implement manufacturers, are charged by the steel consumers and the whole is alleged to be so repugnant to the Federal Trade Commission law and the Clayton law that it should be ordered discontinued.

The filing of the complaint of the steel consumers followed an informal hearing before the commission at the request of Judge Gary and Judge John S. Miller, counsel for the rolled steel consumers.

In urging that the commission go into the subject thoroughly, Judge Gary stated:

"The iron and steel industry in this country really started at Pittsburgh many years ago. That was then probably the cheapest point of production, largely because the fuel was there, in immediate proximity, and the iron ore was brought on the lakes to Conneaut, north of Pittsburgh, and brought by a short railroad to the furnaces; and the limestones were in that vicinity. It was the cheapest point for the assembling of the raw materials, and consequently the cheapest place for producing iron and steel.

"That being so, of course the iron and steel products which were manufactured were sold at a price f.o.b. works or f.o.b. mill, which meant f.o.b. Pittsburgh. Then, later, works were started at other places—Youngstown, not very far from there; Johnstown, in the other direction, not very far from Pittsburgh—and the manufactured products were sold then f.o.b. Pittsburgh."

During these years the custom of the Pittsburgh basing point became so fixed in the steel industry that a change will cause far-reaching results. How serious these resulting changes and how serious the hardships, if any, caused by the present custom are the questions to be argued out before the trade commission.

O. F. S.

Machinery Markets and News of the Works

SMALL SALES PREDOMINATE

Notable Crane Business in the East

Some Lathe Makers Quote Higher and Other Advances Are Expected

The general situation continues to be characterized by a volume of small, miscellaneous orders which, considered in their aggregate, are quite satisfactory, and were it not for the increased capacity of the industry it probably would have more than it could do. A New England builder of machine tools sums up conditions as they prevail with his company by saying it is twice as busy as it was before the war, yet about one-half as busy as it could be. In other words, while doing well in point of output, as compared with pre-war times, there is idle capacity, or some which is not anywhere near maximum production.

More crane business has been placed in the past two weeks than in any similar period since the war ended. The total is about \$2,000,000, including about \$1,000,000 worth for the naval ordnance plant at Charleston, W. Va., orders for which were divided among three makers. The Navy Department has also ordered seven long-span cranes for the Brooklyn Navy Yard. The Bethlehem Steel Co. has bought thirteen 5 and 10-ton cranes for its sheet and tinplate mills at

Sparrows Point, Md.; eight 5-ton cranes for its Saucon works, Bethlehem, Pa., and six 10-ton cranes for its Lebanon, Pa., works.

As has been predicted, several of the lathe makers have advanced their price 10 per cent. An Eastern power press maker has made a similar advance and there is talk of advances in other directions. In the main, deliveries can be made promptly, except in the case of heavy tools and a few others of special types. In Cincinnati the demand is reported especially good for shearing and forming machinery, while lathes are active. In the East much interest has been taken in the auction sale of the equipment of the Standard Aircraft Corporation, Elizabeth, N. J., because of the comparatively high prices obtained.

The Chicago market, in the week, has shown a spurt of activity which promises to make July one of the banner months in that city. Not only has there been good buying, but sales are becoming more important in regard to numbers of machines involved, and there is considerable business in prospect. Milwaukee also reports more inquiry of a healthy character, indicating that manufacturers are more inclined to increase facilities.

It is now seen that the war is responsible for a widening of industrial activity in the Pacific Northwest, inasmuch as manufacturers are not entirely reverting to their pre-war lines. This result, of course, has been more or less in evidence over the entire country.

New York

NEW YORK, July 28.

Dealers who have diversified types of machines to offer report a fairly good routine business, but on the whole the market presents a quiet aspect, and the little betterment noted a week ago is not quite so apparent. The largest deal of the week was the purchase of about twenty cranes, ranging from 5 to 40 tons capacity, by the Bethlehem Steel Co. for delivery to its Sparrows Point and Lebanon plants. Most of these cranes, which have been pending for some time, were placed with an Ohio builder.

Considerable interest was shown in the sale at auction last week of the equipment of the Standard Aircraft Corporation, Elizabeth, N. J. The number of tools offered was not large, as war plants go, but it included a number of standard machines for which exceptionally good prices were obtained; in fact, they were so high that some dealers who were represented at the sale held aloof from buying. They declare they have equally good tools in their warehouses which they will sell for \$200 to \$300 less.

The aggregate of bona fide inquiry is rendered somewhat uncertain, and a good bit of unnecessary work is being made for sellers by the practice of asking for quotations on new tools in order to measure what intending buyers should pay for Government machines. The inquirer, of course, does not state the motive behind his inquiries.

A few plants, among them one manufacturing automobiles and another tin plate containers, are about to enter the market again for equipment not unlike some which they recently sold in settling up Government contracts. It is stated on good authority that the absorption of Government machine tools is proceeding without inflicting much injury on the demand for new tools, inasmuch as about 50 per cent is bought by concerns who would not otherwise be in the market and who are actuated by what they believe is an opportunity to secure bargains. If the purchasers do not have enough work for the machines, they look outside their own shop for contract work to keep them busy.

Several inquiries for heavy tools have come to light, but they are slow in closing. The railroads are doing nothing, except where they require small tools or parts.

Following the forecast of a week ago, one lathe manufacturer has advanced his quotations 10 per cent, and by Aug. 1 it is expected that other similar announcements will be made.

The Philadelphia Navy Yard will soon enter the market for a number of tools.

The American Can Co., which has a number of plants, plans to modernize some of these. It is one of the companies which, having disposed of war equipment, will be a buyer.

Except on heavy machine tools, deliveries can be promptly made in most lines, in some cases direct from stock.

The Mohegan Tube Co., Scott Avenue, Brooklyn, has plans prepared for a one-story addition, 100 x 150 ft., at Scott Avenue and Meserole Street, to cost about \$25,000.

The Mullins Body Corporation, New York, has been incorporated with an active capital of \$1,350,000 by W. P. Carpenter, R. M. Modisette and C. G. Walker, 120 Broadway, to manufacture automobile bodies.

The Mechanical Stokers Corporation, New York, has been incorporated with a capital stock of \$100,000 by M. C. Flanagan, H. H. Van Aken and G. B. Sleigh, 31 Nassau Street, to manufacture stokers and furnace appliances.

The Portable Electric Current Co., New York, has been incorporated with a capital stock of \$2,000,000 by W. A. Blank, L. B. Kanter and C. B. Plante, 761 Lincoln Place, Brooklyn, to manufacture storage batteries and similar products.

The Gem Safety Razor Co., 210 Eleventh Avenue, New York, has increased its capital stock from \$250,000 to \$1,500,000.

Fumagall, Cardone & Surico, Inc., New York, has been incorporated with a capital stock of \$10,000 by T. Cardone, C. Surico and R. Zuchovitz, 844 Forty-second Street, Brooklyn, to manufacture machinery, machine parts and appliances.

The Pyramid Motor Equipment Co., Inc., New York, has been incorporated with a capital stock of \$15,000 by H. S. Ukon, J. B. Eiseman and J. W. Kleinfeld, 333 East Sixteenth Street, to manufacture motor parts, etc.

Lorin W. Young, Inc., New York, has been incorporated with a capital stock of \$20,000 by C. G., G. K., and L. W. Young, 17 West Ninth Street, to manufacture electrical apparatus.

The American Metal Cap Co., 2 Summit Street, Brooklyn, has increased its capital stock from \$100,000 to \$1,000,000.

The K. & L. Standard Foundry, New York, has been incorporated with a capital stock of \$7,000 by B. Klinger, F. Lowe and B. Miller, 2145 Pacific Street, Brooklyn, to manufacture iron castings, etc.

The American Bosch Co., New York, manufacturer of magnetos, etc., with works at Springfield, Mass., has taken bids for the erection of a new ten-story, reinforced-concrete and steel building, 50 x 100 ft., at Columbus Circle, for local headquarters. Andrew J. Sauer & Co., 908 Chestnut Street, Philadelphia, are architects.

The Vulcan Welding Co., New York, has been incorporated with a capital stock of \$20,000 by J. A. McNalara, M. A. Jones and F. Holman, 165 Broadway.

The Kuperman Brothers Tinware Mfg. Co., Brooklyn, has been incorporated with a capital stock of \$50,000 by S. Kuperman, N. Garil and M. Bernstein, 414 Georgia Avenue, to manufacture hardware and tinware products.

The Rotary Brake Co., New York, has been incorporated with a capital stock of \$200,000 by P. S. Morgan, W. F. McCord and W. L. McElreavy, 243 West Fifty-third Street, to manufacture brakes for automobiles.

The Ludlam Appliance Corporation and Armstrong & Co., Inc., both of Colonie, N. Y., have been incorporated with capital stocks of \$75,000 and \$30,000, respectively, by P. A. E. Armstrong, P. Corning and H. G. Batcheller, Colonie, to manufacture metal products.

The Bureau of Yards and Docks, Washington, has arranged for the construction of a new shipbuilding way at the Brooklyn Navy Yard, with repair and construction facilities, to increase the present capacity.

The J. M. Lehmann Co., New York, has been incorporated with a capital stock of \$150,000 by E. E. Mueser, F. Notz and T. Weygant, 101 Varick Street, to manufacture foundry products.

The J. L. Mott Iron Works, 118 Fifth Avenue, New York, have leased the property and buildings at the corner of Broadway and Hopkins Avenue, Long Island City, for a term of years.

The Ever Ready Clamp Co., New York, has been incorporated with a capital stock of \$10,000 by J. Downing, T. Hill and W. Korzeman, 21 East 119th Street, to manufacture clamps, auto parts and other metal products.

The W. & F. Garage & Auto Repair Co., New York, has been incorporated with a capital stock of \$10,000 by J. Fullerman and J. and A. Wildstein, 107 East Tenth Street, to manufacture auto parts, etc., and to conduct a general machine works.

Edwards & Co., Exterior Street, corner 140th Street, New York, manufacturers of electrical equipment, alarms, etc., have filed plans for extensions and improvements in their five-story plant, 40 x 94 ft., to cost about \$40,000.

The Hughes Machine Corporation, New York, has been incorporated with a capital stock of \$40,000 by L. P. Hughes, M. H. and Ray T. Berry, 625 East Nineteenth Street, Brooklyn, to manufacture machinery, parts, etc.

Lorin W. Young, New York, has leased the four-story building at 214 East Fortieth Street, for the establishment of a new works for the manufacture of electric lighting fixtures.

The Atlantic Smelting & Refining Works, Inc., 57 Richards Street, Brooklyn, is planning for the erection of a smelting and refining plant in Avenue R, near the Newark Transfer, Newark, N. J., where the company owns 6 acres. It is said that the plant will be one of the largest of its kind in the country. The present works at Brooklyn will be removed to the new site on completion of the works.

The De Laval Separator Co., 165 Broadway, New York, manufacturer of cream separators and other dairy equipment, is building a one-story addition to its plant at the foot of Pine Street, Poughkeepsie, N. Y., to cost about \$40,000.

The Troy Boiler Works, Troy, N. Y., is planning for the erection of an addition to its plant to cost about \$25,000.

The Fraser, Brace & Clarke Corporation, New York, affiliated with Fraser, Brace & Co., 1328 Broadway, New York, contractors, has commenced the construction of a large drydock and ship repair plant on shore front property on New York Bay, Clifton, S. I. The property has a water frontage of about 546 ft., and aggregates close to 11 acres. The new plant will specialize in repair work, and with machinery and equipment is estimated to cost in excess of \$1,000,000.

The Foster Brothers Mfg. Co., Broad Street, Utica, N. Y., manufacturer of brass beds, springs, etc., has arranged for the immediate erection of a two-story addition to cost about \$40,000.

The Larrabee-Deyo Motor Truck Co., Binghamton, N. Y., has awarded a contract to Klein & Griffith, 29 Highland Avenue, for the construction of its new plant on Washington Street to cost about \$200,000. The structure will be an addition to the present works.

B. O. Moffitt & Sons, 37 Collier Street, Binghamton, N. Y., are planning for the erection of a new machine shop and automobile service works to cost about \$15,000.

The George H. Ruby Hardware Co., Oneida, N. Y., has been incorporated with a capital stock of \$35,000 by R. B., T. K., and George H. Ruby, to manufacture hardware products.

The Wayland Ventilator Co., Wayland, N. Y., has been organized by W. B. Clayton, W. W. Capron and E. H. Perkins to manufacture ventilators and ventilating equipment.

The Rickert-Shafer Co., West Eleventh Street, Erie, Pa., manufacturer of machine tools, is planning for the erection of a two-story addition, 35 x 150 ft.

The Bell Brothers Co., Haddonfield, N. J., has been incorporated with a capital stock of \$50,000 by Edwin R. and Ezra C. Bell, and Abbe H. Smith, to manufacture agricultural machinery and equipment.

The plant of the C. & C. Electric & Mfg. Co., Garwood, N. J., will be sold at public sale, 12 noon, Aug. 4, by William E. Tuttle, Jr., receiver. The sale will include land totaling about 5 acres; buildings aggregating about 60,000 sq. ft. of floor space; power plant, 10-ton traveling crane and machine tools.

The Spicer Mfg. Corporation, South Plainfield, N. J., manufacturer of drop forgings for automobiles, is having plans prepared for the erection of a one-story addition to its plant, 100 x 200 ft., to cost about \$75,000, including equipment.

L. Sonneborn Sons, Inc., 262 Pearl Street, New York, is taking bids for the erection of a one-story addition to its oil manufacturing plant, 38 x 112 ft., at Nutley, N. J. A boiler plant, 40 x 52 ft., will also be constructed.

The Martin Troop Co., Bayonne, N. J., has been organized by Martin and Philip Troop to manufacture metal guards and kindred specialties.

The S. H. S. Machinery Co., Bayonne, N. J., has filed notice of organization to manufacture motor truck parts, etc. The office will be located at 30 Halsey Street, Newark. Samuel Horwitz, 795 Boulevard, Bayonne, heads the company.

The Brady Brass Co., 170-184 Fourteenth Street, Jersey City, N. J., has filed plans for the erection of a one-story shop addition.

The Forney Fibre Co., Jersey City, N. J., has been incorporated with a capital stock of \$100,000 by Robert F. and F. A. Dennis, and Carl W. Forney, to manufacture fibre products.

The Gordon Products Co., Union Hill, N. J., has been incorporated with a capital stock of \$100,000 by Edward Hollander and William Gordon, to manufacture hardware and other metal specialties.

The Victory Machine & Tool Co., 393 Mulberry Street, Newark, N. J., has filed notice of organization to manufacture machinery and tools. Harry and Max Olshan, 54 Seymour Avenue, head the company.

William S. Roe, 17 Mechanic Street, Newark, N. J., dealer in pipe, mill products, etc., has taken over the former plant of the National Saw Co., River Street, comprising three buildings with total floor area of about 70,000 sq. ft. The new owner plans to use the structures for pipe bending.

The Auto Motive Equipment Co., Newark, N. J., has been incorporated with a capital stock of \$200,000 by Roy J. Harding, R. C. Duerr and James Mango, to manufacture automobile parts and other equipment.

The Klaxon Co., 194 Wright Street, Newark, N. J., has plans prepared for the erection of a one-story addition, 40 x 60 ft., to cost about \$10,000.

The Celluloid Co., 290 Ferry Street, Newark, N. J., has filed plans for the erection of a one-story addition, 28 x 69 ft., to its plant on Niagara Street, to cost about \$15,000.

Simon & Krivit, Inc., Newark, N. J., has been incorporated with a capital of \$100,000 by Charles Simon, M. Krivit and Theodore Rurode, to manufacture metal specialties and conduct a smelting and refining works.

The Overland Tire Co., 15 River Street, Newark, N. J., has arranged for a stock issue of \$400,000 for expansion. The company plans the operation of a local plant, with yearly production aggregating 200,000 tires.

The General Electric Co., Harrison, N. J., is taking bids

for the erection of a new four-story plant to be located in the vicinity of Newark, N. J.

The Interstate Tire Corporation, Newark, N. J., has been incorporated with a capital stock of \$120,000 by William E. Gilmore, Harry M. Friend and Jacob E. Saloman, to manufacture automobile tires.

S. de Barrenechea, 25 Beaver Street, New York, importer and exporter, is in the market for the following second-hand material and equipment: Steel frame buildings, 70 x 150 ft., steel tanks of about 3000 gal. capacity, machine lathes 28-in. by 14 ft., 8 ft. x 4 ft. planers and 28-in. vertical drilling machines.

Frank J. Dougherty has purchased from the Sea Trade Corporation, the entire plant and machinery with stock and contents of the building at 186 Washington Street, New York, and is fully-equipped for marine plumbing, steam fitting and ventilating, sheet-metal, copper work, etc.

Philadelphia

PHILADELPHIA, July 28.

The Ordnance Department, Washington, has completed an inventory of the stock and equipment at the Eddystone munition works, Eddystone, near Philadelphia, used during the war for the production of rifles. The inventory required 83 working days with 148 men, and is said to have cost \$89,720. The articles counted and listed totaled 42,567,500. During its operation the plant produced 1,352,477 United States rifles, 1917 model, and 607,092 British Enfield rifles. The maximum production for one day was 7,201 rifles, with highest daily average of about 5,000. At one time the plant gave employment to 15,097 persons, with weekly payroll aggregating \$402,817; in addition, there were 1,317 Government inspectors. The plant covers an area of 34½ acres, with total floor space in buildings about 33½ acres.

The Atwater-Kent Mfg. Works, 4937 Stanton Avenue, Philadelphia, manufacturer of ignition equipment, is considering the erection of a two-story addition to its plant.

The Wright Roller Bearing Co., Twentieth Street and Indiana Avenue, Philadelphia, has increased its capital stock from \$1,000,000 to \$2,000,000.

The Queen Metal Co., 234-36 Queen Street, Philadelphia, is planning for improvements and extensions in its plant to cost about \$4,000.

The Railway Electric Equipment Co., Philadelphia, has been incorporated with a capital stock of \$2,000,000 under Delaware laws by Henry McCarthy James F. Bohen and Herbert W. Andrews, all of Philadelphia, to manufacture electrical goods.

David McKibben, 2900 Allegheny Avenue, Philadelphia, will build a one-story repair and automobile service shop, 100 x 134 ft., at Howard and Clifton streets, to cost about \$20,000.

The Susquehanna Collieries Co., Shamokin, Pa., is planning improvements and extensions at its different collieries, including the installation of new machinery and equipment to cost about \$4,000,000.

The Bureau of Yards & Docks, Washington, has awarded a contract to M. H. McCloskey, Jr., Inc., 1620 Thompson Street, Philadelphia, for the erection of a three-story concrete and steel pattern shop, 105 x 230 ft., at the League Island Navy Yard, Philadelphia, to cost \$262,262. The first heat of steel in the new foundry at the yard has been made, with charge consisting entirely of scrap; the furnace is of the Greaves-Etchell electric type.

A one-story power plant, 30 x 94 ft., will be erected by C. H. Masland & Sons, Amber and Westmoreland streets, Philadelphia, in connection with their new plant at Carlisle, Pa., for carpet manufacture. Lockwood, Greene & Co., 101 Park Avenue, New York, are architects.

The Hamilton Rubber Co., Mead and Prince streets, Trenton, N. J., has increased its capital from \$300,000 to \$1,000,000. The company is planning for the erection of a three-story addition to its mechanical rubber goods manufacturing plant, about 75 x 75 ft. G. R. Cook is president.

The new addition to be erected at the works of the National Radiator Co., East State and Whitehead streets, Trenton, N. J., will be used as a core department and for foundry operations. The structure will be one-story, 76 x 317 ft.

The Trenton Electric & Conduit Co., Trenton, N. J., has filed plans for the erection of a two-story brick addition to its plant on Tyler Street, to cost about \$10,000.

The Thermoid Rubber Co., Whitehead Road, Trenton, N. J., manufacturer of mechanical rubber goods, is having plans prepared for the erection of an addition to its plant. R. J. Stokes is secretary.

The Camden Motor Corporation, Camden, N. J., has commenced excavations for its proposed new one-story plant, 301 x 750 ft., on the Whitehorse Pike, to cost about \$100,000. D. Merritt Davis, Temple Building, heads the company.

A one-story power plant, 13 x 140 ft., will be constructed by the Hershey Chocolate Co., Hershey, Pa., in connection with a new addition to its plant to cost about \$500,000.

The International Boiler Works, East Stroudsburg, Pa., is planning the rebuilding of its plant destroyed by fire July 2, with loss reported at about \$300,000.

New England

BOSTON, July 28

The degree of prosperity of the machine tool builders of New England is voiced by one of them who states that his company is twice as busy as it was before the war and half as busy as it could be. The statement puts into words the expansion of capacity of this branch of manufacturing industry in the past few years, and indicates that there is really a great deal of new machine tool business. A demand for more or less special tools was the big factor in keeping the shops running, following the armistice, but now orders consist more generally of the standard types, including such tools as lathes, planers, drilling machines, shapers, etc., which a while ago were believed to be due for a period of dull business that might endure for some time. The manufacturers report that the last two months has shown a good deal of change for the better, and no word of discouragement is heard anywhere. On the contrary, expressions of genuine optimism are frequent, both by the owners and their representatives among the dealers.

New England produces a vast total of machinery used in a wide variety of industries, such as paper box machinery, envelope machinery, shoe machinery, confectioners' machinery, canning machinery, and so on. Most of the firms building machinery of these types are busy, and, in the aggregate, are themselves large buyers of equipment in the market today. Builders of electrical machinery and manufacturers of all kinds of electric equipment report an increasing demand for their goods. The manufacturers of automatic sprinklers are coming in for a good deal of new business, the result not only of new building construction, but a greater degree of enterprise on the part of owners of older buildings, in the effort to decrease fire risk and at the same time to lower their insurance bills. The textile machinery industry shows no abatement in its buying of machine tools. Dealers report also that they are finding customers in unexpected places, particularly with small concerns, who now see their way toward increasing manufacturing capacity.

The M. S. Wright Co., Worcester, Mass., manufacturer of piano actions and vacuum cleaners, has taken the space in the building at 47 Lagrange Street, recently vacated by the Sleeper & Hartley Co., which has moved into its new shops. This acquisition gives the Wright Co. 10,000 sq. ft. of new floor space, which is needed, as the 70,000 sq. ft. of the present plant is crowded to a serious extent. The company has been buying a good deal of new equipment.

The Greenman Steel Treating Co., Worcester, Mass., of which Lawrence P. Greeman is proprietor, has moved into its new plant at 284 Grove Street. The company specializes on the heat treatment of all kinds of steel.

The Neptune Hardware Mfg. Co., East Norwalk, Conn., has awarded a contract to the Tracy Brothers Co., Waterbury, for the erection of a two-story addition, 60 x 80 ft.

The Johnson Machine Works, Inc., New Haven, Conn., has been incorporated with a capital stock of \$20,000 by F. G. and F. C. Johnson and T. P. Tonne to manufacture machinery and parts.

The Hardware City Mfg. Co., New Britain, Conn., has been incorporated with a capital stock of \$25,000 by C. S. Casperon, J. A. Anderson, J. A. Parsons and D. A. Raschkow, to manufacture hardware and metal specialties.

The Mills Machine Co., Lawrence, Mass., is planning for the erection of a new one-story machine shop, 96 x 100 ft., to cost about \$30,000.

The New Departure Mfg. Co., Bristol, Conn., manufacturer of ball bearings, has filed plans for the erection of a one-story addition to its plant on Center Street.

The J. T. Young Boiler Co., Norwich, Conn., has filed notice of dissolution.

The Auto Metal Body Co., Dean Street and Broadway, Providence, R. I., has filed notice of organization to manufacture metal automobile bodies and other specialties. Emil and Otto Linoroth, 33 Bourn Street, head the company.

The Connecticut Fibre Products Co., Hartford, Conn., has

been incorporated with a capital stock of \$50,000 by T. M. Cunningham, Hartford; David Maier and W. H. Barnes, New York, to manufacture special collapsible fibre products.

The George W. Richardson Co., Newburyport, Mass., manufacturer of celluloid specialties, is said to be planning for the rebuilding of the portion of its works destroyed by fire July 16, with loss estimated at about \$100,000.

The Bar Mills Power Co., Bar Mills, Me., is planning for the establishment of a new hydroelectric power plant. A former local manufacturing mill will be converted for this purpose.

The Revere Rubber Co., Providence, R. I., a subsidiary of the United States Rubber Co., New York, has awarded a contract to the Cruise & Smiley Construction Co., Providence, for the erection of a two-story brick plant addition, 25 x 100 ft.

The Bilton Machine Tool Co., Bridgeport, Conn., has taken out a permit to build a one-story addition to its works on North Washington Avenue.

The Boston Woven Hose & Rubber Co., Hampshire Street, Cambridge, Mass., has awarded a contract to William Fillmore & Co., 25 Cherry Street, for the erection of a one-story addition, 50 x 165 ft.

The Victory Mfg. Co., Providence, R. I., has been incorporated with a capital stock of \$90,000 by J. Warren Lander, Warwick; Benjamin F. Tefft, Jr., and Eugene Fuller, Providence, to manufacture machinery.

The Beacon Oil Co., Boston, affiliated with the New England Fuel & Transportation Co., 111 Devonshire Street, is having plans prepared for an oil manufacturing plant at South Everett, Mass., to cost about \$100,000, including machinery. The Leonard Engineering Co., McCormick Building, Chicago, is the engineer.

Buffalo

BUFFALO, July 28.

The Niagara Machine & Tool Co., Buffalo, is having plans prepared for 1-story factory additions, 75 x 180 ft., and 90 x 30 ft., at its plant, Northland Avenue and the New York Central Railroad Belt Line.

The Sargent & Greenleaf Co., Rochester, manufacturer of locks, etc., is having plans prepared for a factory of 50,000 sq. ft. floor space, estimated to cost about \$150,000. W. H. Foxhall is vice-president.

The United States-Hoffman Co., Syracuse, N. Y., manufacturer of pressing machines, has awarded contract to Dawson Brothers, Syracuse, for one-story plant extension, 80 x 200 ft., and a powerhouse, 40 x 60 ft., to cost \$100,000 with equipment.

The St. Lawrence River Motor & Machine Co., Clayton, N. Y., will erect a machine shop at an estimated cost of \$15,000.

Contract has been let by the Hall Engine Co., Erie, Pa., for a shovel plant addition, 116 x 200 ft., to cost \$75,000.

The Beaver Board Co., Military Road and Beaver Road, Buffalo, has completed plans for an addition 125 x 600 ft., one and two stories, to cost approximately \$200,000. Plasterboard will be the product in this new addition. Construction is to be commenced Aug. 15.

The Buffalo Forge Co., 490 Broadway, Buffalo, has filed plans for a brick and steel addition to cost about \$14,000.

The Union Iron & Foundry Co., Buffalo, has been incorporated with a capital stock of \$25,000 by J. J. Fry, A. G. and M. A. Asbery to manufacture iron and steel castings, etc.

The Niagara Machine & Tool Co., 683 Northland Avenue, Buffalo, is having plans prepared for a one-story addition, 75 x 180 ft., and 10 x 90 ft. H. E. Blumer, Ellicott Square Building, is the architect.

Michael Hayman & Co., 856 East Ferry Street, Buffalo, manufacturers of metal products, are planning for a one-story foundry to cost \$10,000.

The new machine shop of the Donner-Union Coke Co., Buffalo, to be located at its new Abby Street plant, is estimated to cost about \$17,000. The company has also filed plans for a steel and concrete coal-storage addition to cost, with equipment, about \$70,000.

The Atterbury Motor Car Co., Hertel and Elmwood avenues, Buffalo, manufacturer of automobiles, has completed plans for the first of the proposed additions at its works, a one-story building, 80 x 180 ft. Harry F. Hudson, Dun Building, is the architect.

The Standard Stove Co., Jamestown, N. Y., has been incorporated with a capital stock of \$500,000 by Patrick S. and John J. Guelmare and Henry Mueller, Jamestown, and Leo H. Ludwig, Falconer, N. Y., to manufacture stoves, etc.

Levering Brothers, Baltimore, Md., manufacturers of castings, etc., are said to have acquired two additional acres of ground in connection with their plant on the Niagara River Road, Buffalo, recently purchased from the Pierce-Arrow Motor Car Co. for later expansion.

The Niagara Falls Gas & Electric Light Co., Riverway, Niagara Falls, N. Y., will build a new power plant on Buffalo Avenue and Twenty-second Street, to cost about \$200,000.

The Rochester Aircraft Corporation, Rochester, N. Y., has been incorporated with a capital stock of \$30,000 by E. F. Beers, W. H. Knight and T. Woods, to manufacture aeroplanes and parts.

The Batavia Rubber Co., Robertson Street, Batavia, N. Y., is planning for an addition to cost about \$125,000. Of this amount, approximately \$65,000 will be expended for equipment.

Kellogg & Lawrence, Inc., Katonah, N. Y., has been incorporated with a capital stock of \$50,000 by H. W. Kellogg, A. Elliott and F. Lawrence to manufacture hardware, etc.

H. A. Moyer, Inc., Syracuse, N. Y., has been incorporated with a capital stock of \$25,000, to manufacture automobile parts. H. A., B. W. and A. H. Moyer are the incorporators.

The Roadmasters Motors, Inc., Rochester, N. Y., has been incorporated with a capital stock of \$25,000 by A. Holley, 300 Birr Street; A. J. Tischer, 434 Seneca Parkway; and R. K. Chase, 35 Chestnut Street, to manufacture automobile motors, parts, etc.

The Stratton Engineering Corporation, Buffalo, has been incorporated with a capital stock of \$250,000 by R. Swank, J. E. Barry and E. S. Leitze, 517 Pearl Street, to manufacture machinery and parts, with the operation of local machine and mechanical shops for repair work, etc.

Baltimore

BALTIMORE, July 28.

The Mexican Petroleum Co., 120 Broadway, New York, has completed negotiations with the city of Baltimore for property at Wagner's Point, comprising about 90 acres, to be used for a new oil refinery. The proposed plant, it is said, will cost about \$500,000.

The new building to be erected by the Canon Air Brake Co., Calvert Building, Baltimore, will be equipped as a machine shop. The structure will cost about \$100,000.

The Hygienic Bottle Cap Co., Calvert Building, Baltimore, has acquired a building at 1511 Harford Avenue, which will be remodeled and improved. Machinery and equipment will be installed to provide a capacity of about 1,000,000 caps daily. Worthy H. Gee is president.

The High Point Pin Co., High Point, N. C., is considering the rebuilding of its plant recently destroyed by fire with loss of about \$15,000. Elwood Cox is president.

The Taylor Iron Works & Supply Co., Macon, Ga., is planning for the construction of a new one-story addition, 65 x 80 ft., to be used as a gray-iron foundry.

Price Brothers, Forty-sixth and East Patrick streets, Frederick, Md., have broken ground for the erection of a new one-story addition, 37 x 160 ft., to their plant at Second and Church streets. The structure will be used as a foundry and machine shop, and is estimated to cost about \$18,000.

The Bureau of Yards & Docks, Washington, has awarded a contract to the McLean Contracting Co., Fidelity Building, Baltimore, for the erection of a new machine shop at the naval works at Yorktown, Va.

The Bruce Dry Dock Co., Pensacola, Fla., has completed plans for the erection of its proposed new dry dock to cost about \$450,000. The structure will have five floating pontoons, each 40 x 100 ft., and 10 ft. deep, and will be provided with shop buildings for construction and repair work. About 20 electrically operated centrifugal pumps will be installed for emptying the dock.

The Virginia Rubber Co., Charleston, W. Va., recently incorporated with a capital stock of \$1,200,000, is planning for the establishment of a local plant, 60 x 250 ft. and 40 x 60 ft., for the manufacture of mechanical rubber goods and automobile tires. The proposed plant will have an initial capacity of about 500 tires per day. A. A. Lilly is president, and Houston G. Young, vice-president.

The Adelphia Garage Co., 2325 Callow Avenue, Baltimore, is planning the erection of a new one-story machine repair and service shop, 120 x 240 ft., to cost about \$55,000, including equipment.

The Victory Rubber Mfg. Co., Atlanta, Ga., has been

incorporated with a capital stock of \$500,000 by George J. Meuter, A. P. Phillips and E. W. Van Duzen, to manufacture mechanical rubber goods and other rubber products.

The Laib Co., Eighteenth and Magnolia streets, Louisville, Ky., manufacturer of pipe, mill supplies, etc., has arranged for the erection of a one-story addition, 100 x 530 ft., to cost about \$30,000.

The Industrial Laboratories, Fort Smith, Ark., are planning for the installation of new machinery and equipment at their plant for the manufacture of metal drums, etc. The production will be in 26 and 30-gage metal. Otto V. Martin heads the company.

The Rodgers Gun & Machine Co., Memphis, Tenn., has been incorporated with a capital stock of \$300,000, in Delaware, by S. T., L. C. and B. C. Rodgers, all of Memphis, to manufacture machinery, machine parts and general mechanical equipment.

The Reinhard Motor Co., 128 West North Avenue, Baltimore, has purchased the building it occupies and the adjoining property and will raze the buildings and construct a salesroom and an automobile repair shop.

The Baltimore Gas Appliance & Mfg. Co., Wicomico and Bayard streets, Baltimore, will build a one-story addition, 25 x 133 ft., to cost \$8000.

The Baltimore Copper Smelting & Rolling Co., Third Street and First Avenue, Baltimore, will construct a one-story plant addition, 45 x 100 ft., to cost \$6000.

The Maryland Motor Co., West Patrick Street, Frederick, Md., will build a garage to cost \$25,000 and install garage and machine-shop equipment. Charles H. Kehne heads the company.

The Hill-Field Body Co., Salem, Va., is considering the construction of a plant for the manufacture of steel truck bodies. H. B. Rockhill is president.

A machine shop will be built at Yorktown, Va., for the Navy Department.

The Peerless Steel Shutter Co., Richmond, Va., has been incorporated with a maximum capital stock of \$2,000,000. R. E. Winfred is president and Allan Talbott secretary.

The Bureau of Yards and Docks, Navy Department, Washington, D. C., will install motor-driven forge and furnace and machine shop and heat treatment equipment at the Naval Ordnance plant, Charleston, W. Va.

The Lockhart Power Co., Lockhart, S. C., will build a power house 100 x 36 ft. Enslie Nicholson is president.

The Taylor Iron Works & Supply Co., Macon, Ga., will build a gray-iron foundry.

Pittsburgh

PITTSBURGH, July 28.

The Falcon Steel Co., which is building a new sheet mill plant at Niles, Ohio, has placed a contract for three 10-ton and two 30-ton cranes with the Morgan Engineering Co., Alliance, Ohio, and has given a contract for mill motors and switches to the General Electric Co.

The Newton Steel Co., recently organized to build a sheet mill plant at Newton Falls, Ohio, has placed a contract with the General Electric Co. for the mill motors and switches and with the Alliance Machinery Co., Alliance, Ohio, for four electric cranes.

The J. E. Moss Iron Works, Wheeling, W. Va., maker of ornamental iron, structural steel and fire-proofing products, which is building an addition to its plant, is in the market for one 7½-ton and several 5-ton electric traveling hoists, also one or more 10-ton 50-ft. span cranes and combination bending and straightening rolls.

The Ordnance Department, Washington, is planning for the installation of equipment at its new naval ordnance works at Charleston, W. Va., now in course of construction. The installation will comprise open-hearth forges, hand and electric-driven; furnace equipment, machine-shop and heat-treatment apparatus, and other equipment.

The C. P. Levering Co., Pennsboro, W. Va., manufacturer of rubber products, has been taken over by a new company to be known as J. H. Parker & Sons, Inc. The new organization plans for extensive activities in the matter of rubber insulation products, and is said to be planning for increased output.

The Bluestone Auto Accessory Mfg. Co., Princeton, W. Va., recently incorporated with a capital stock of \$20,000, is planning the establishment of a plant. Equipment will be in-

stalled for the production of castings, chains and kindred specialties. E. F. Peters is president.

The Ohio Valley Mine Car & Mfg. Co., Huntington, W. Va., recently organized with a capital stock of \$200,000, is planning the erection of a new plant for the manufacture of mine cars, parts, etc., with initial capacity of about 30 cars per day. M. E. Brown is president.

The Pittsburgh Malleable Iron Co., Pittsburgh, has acquired the former plant of the General Chemical Co. on Fifty-seventh Street, near the Pennsylvania Railroad, comprising about 7 acres of land and a number of buildings, for a consideration said to be about \$300,000. The company will remodel and improve the present structures for its own occupancy, and plans to remove its present works at Thirty-fourth and Smallman streets to the new location.

The E. J. Thompson Co., Louisa Street, Pittsburgh, manufacturer of automobile parts, iron and steel products, etc., has commenced the erection of a new one-story plant, 250 x 450 ft., at Lexington Avenue, near the Thomas Boulevard, to cost about \$250,000.

The National Casket Co., 470 Jackson Avenue, Long Island City, N. Y., has awarded a contract to the Hughes-Foulkrod Co., Commonwealth Building, Philadelphia, for the erection of a new five-story plant at Reedsdale and Mumford streets, Pittsburgh, to cost about \$200,000.

The Sanitary Cooler Co., McKeesport, Pa., has been incorporated in Delaware with capital stock of \$20,000 by Patrick H. Joyce and Walter L. Riggs, McKeesport, to manufacture refrigerators and refrigerating equipment.

Chicago

CHICAGO, July 28.

After a short period of lessened activity business has revived to such an extent that the general consensus of opinion is that July will be a banner month. Orders for single machines continue to predominate, but a number of new inquiries for fair-sized lists have appeared. A number of lathe manufacturers in this territory will advance their prices on Aug. 1. A manufacturer of milling machines and a maker of tool grinders will also announce advances soon. An eastern manufacturer of power presses recently raised his prices 10 per cent.

The Continental Motors Corporation, Muskegon, Mich., has ordered 5 turret lathes, a number of drill presses and milling machines, in addition to the purchases announced a week ago. The Chicago branch of the Samuel Cupples Envelope Co., St. Louis, recently purchased 2 engine lathes, 2 drill presses, 2 grinding machines, a milling machine and a shaper. The Canedy-Otto Mfg. Co., Chicago Heights, Ill., recently purchased a list of tools, including 1 turret lathe, 2 milling machines, an engine lathe, a horizontal boring machine and a universal grinding machine. Montgomery Ward & Co., Chicago, has practically closed for a list of tools to be installed in its farm gas engine plant at Springfield, Ill.

The Bucyrus Co., South Milwaukee, Wis., which purchased a portion of a large list some weeks ago, is about to close for the remainder. The Grip Nut Co., Fifty-ninth Street and Western Avenue, Chicago, the Gill Mfg. Co., 351 West Fifty-ninth Street, and the Iron Mountain Co., formerly the Jackson Park Garage & Machine Co., 6416 Stonely Island Avenue, have sent out inquiries for new equipment. The B. & W. Mfg. Co., 5235 Ravenswood Avenue, Chicago, is contemplating the purchase of additional punch presses.

Union delegates representing the building trades in this city, including about 110,000 workers locked out since July 18, have voted to resume work under the old conditions and to arbitrate their grievances. The Foote Brothers Gear & Machine Co., the William Ganschow Co. and the D. O. James Mfg. Co. are still closed on account of strikes, and a fourth gear manufacturer, the Chicago Gear Mfg. Co., was forced to shut down on account of a strike on July 21.

The Amalgamated Machinery Corporation, 72 West Adams Street, Chicago, is constructing a five-story plant addition, 90 x 300 ft. This company, which manufactured special munitions turning machinery during the war, is preparing to build steam-driven motor cars.

The Pollak Steel Co., South Chicago, Ill., will soon commence the construction of an addition to its drop forge plant. The building will be 75 x 141 ft. and will cost \$225,000.

The Economy Machine Products Co., August Kopinski, president, 4755 London Avenue, Chicago, contemplates the erection of a factory with a frontage of 161 ft. on a site 161 x 205 ft., on the north side of Lawrence Avenue, 240 ft. east of Lipps Avenue.

Louis Lenle, architect, 719 Waveland Avenue, Chicago, has completed plans for a one and two-story factory, 50 and 75 x 125 ft., to be erected on the south side of Cornelia Avenue, near Seminary Avenue, for the Westerlin & Campbell Co., manufacturer of refrigerating machinery. It will cost \$50,000.

Hoelt & Co., manufacturer of dies and metal specialties, Chicago, has awarded a contract for the erection of a one and two-story addition, 120 x 122 ft., at 1608 to 1618 West Kinsie Street, at an estimated cost of \$35,000.

The Wahl Co., manufacturer of adding machines, 1800 Roscoe Street, Chicago, has received bids on a five-story factory, 124 x 150 ft., to be erected on the north side of Roscoe Street near Lincoln Street. It will cost \$200,000.

The Ellis Drier and Elevator Co., manufacturer of grain elevating machinery, 732 Postal Telegraph Building, Chicago, will construct a one-story plant, 81 x 160 ft., at 1201-1225 South Talman Avenue, to cost \$22,000.

The Vocola Talking Machine Co., 155 North State Street, Chicago, has been incorporated by William A. Mangless, Earl I. Schneider and C. B. Potter with a capital stock of \$50,000.

The Woodruff Safety Fire Arms Co., 81 East Madison Street, Chicago, has been incorporated by Arthur L. Wilson, John Copeland and Joseph P. Dupaquier with a capital stock of \$160,000.

The Tracy Motor Corporation, 206 South State Street, Geneseo, Ill., has been incorporated with a capital stock of \$25,000 by Glenn K. Tracy, Richey Dean and Cornelius F. Mobert.

The Vesta Pacific Battery Co., 2100 Indiana Avenue, Chicago, has been organized with a capital stock of \$25,000 by John G. Campbell, John D. Peterson and James J. Donaher.

Roy W. and Harry L. Ide and Henry E. Maurer, Jr., 311 North Fifth Avenue, Springfield, Ill., have filed a petition for incorporation under the name of Ideco, to manufacture and sell machinery. The capital stock is \$5,100.

The Brun-Mill Co., Pittsfield, Ill., has filed a petition for incorporation to manufacture and sell metal goods. The capital stock is \$25,000, and the incorporators include Melville Miller, Felix B. Miller, David L. and Samuel H. Brunswick.

The Pan-American Automobile Co., Decatur, Ill., has commenced the construction of a \$15,000 addition.

The Carrell Motors Corporation, Petersburg, Ill., has secured a factory site near the Chicago & Alton Railroad station.

The Swanson Electric & Mfg. Co., Evansville, Ind., has been incorporated with a capital stock of \$85,000 to manufacture and sell electrical apparatus. The incorporators include B. C. Persons, C. H. Battin and A. L. Swanson. The company has a plant at First and Ingle streets.

The United Engineering Co., Greensburg, Ind., has been incorporated with a capital stock of \$150,000 to manufacture and assemble chassis for automobiles.

The Winter Stamping Co., Goshen, Ind., has been incorporated with a capital stock of \$50,000 to manufacture metal products. Directors are John Doretta, R. and Cecil L. Winter.

The Fort Wayne Oil Tank & Pump Co., Fort Wayne, Ind., will construct an additional shop, 140 x 400 ft., for the manufacture of oil tanks.

The Laurel Motors Corporation, Anderson, Ind., will build a one-story plant, 60 x 180 ft. C. E. Hayes is general manager.

The St. Joseph Iron Works, St. Joseph, Mich., has commenced the erection of an addition, 40 x 45 ft., to be occupied by the blacksmith shop of the plant.

The Gale Mfg. Co., manufacturer of automobile castings, Albion, Mich., will be enlarged. Part of the present plant will be torn down and the present foundry will be extended.

The Wilmarth Show Case Co., Grand Rapids, Mich., has awarded a contract for the construction of an additional story to its three-story plant. The cost will be \$25,000.

The Production Foundries Co., Ann Arbor, Mich., has been incorporated with a capital stock of \$100,000 to engage in the general foundry business. Incorporators include Walter O. Adams of the Ann Arbor Machine Co., Edward P. Mills and others.

The Des Moines Foundry & Machine Co., Des Moines, Iowa, a recently organized company, will erect a plant on the Chicago & North Western Railroad, to cost \$250,000. Emil Schmidt, president of the Des Moines City Railway Co., is president.

The Blackhawk Tire Co., Des Moines, Iowa, is breaking ground for the first unit of its tire plant at East Twentieth Street between Capitol Avenue and Walnut Street. The

building will be two stories in height, 320 x 640 ft., and will cost \$150,000. Officers include William Moran, Granger, Iowa, president; John F. Griffin, Des Moines, vice-president; J. J. O'Malley, American Trust & Savings Bank, Des Moines, treasurer, and E. A. Lewis, Des Moines, secretary.

The Carter-Mayhew Mfg. Co., Minneapolis, Minn., has been incorporated with a capital stock of \$350,000 to manufacture grain elevating and milling machinery. The incorporators are Clarence W. Carter, president; J. Howard Mayhew, vice-president, and H. M. Grenell, secretary-treasurer.

The Apex Appliance Co., 3231 West Thirtieth Street, Chicago, manufacturer of washing machines, is having plans prepared by Ralph C. Harris, 190 North State Street, for its proposed new five-story plant, 100 x 300 ft., at Thirtieth and Sawyer streets. The new works, with machinery installation, will cost about \$275,000. The company recently increased its capital from \$100,000 to \$500,000.

The Chicago Molding Process Corporation, Chicago, has been incorporated with a capital stock of \$10,000 by Frank B. Gorin, Adolph H. Ruth and John J. Anderson, to manufacture mechanical equipment.

The Westerline-Campbell Co., 26 North Clinton Street, Chicago, manufacturer of ice-making and refrigerating machinery, is planning the erection of an addition on property recently acquired on Cornelia Avenue, 50 x 125 ft. The proposed structure will be two-story, and it is estimated to cost \$35,000.

The Cushman Auto Tool Co. has changed its name to the Cushman Co., Inc., for the reason that the original name is no longer descriptive of its activities. While it continues to manufacture many automobile tools, its business is now largely with hardware jobbers on a general line of tools. The company has completed plans for extensive plant additions and additional equipment. There is no change in the personnel of the management except that O. H. Hyde, president Western Tool and Mfg. Co., and of the Safety Emery Wheel Co., both of Springfield, Ohio, has recently purchased an interest and becomes a director.

Cleveland

CLEVELAND, July 28.

Several lathe manufacturers have announced a 10 per cent advance in engine lathe prices, effective Aug. 1. There seems to be some uncertainty among the trade at present as to how general this advance will be, but it is stated that it includes builders who made the sharpest cut in prices early in the year, and it is expected that practically all the leading makers will eventually make the advance. With the increase in manufacturing costs some machine tool builders who made no reduction in prices after the war demand ceased are considering marking up prices.

The market is not as active as it has been, but dealers are still taking a fair volume of small lot orders. The Studebaker Corporation, which recently came in the market for a large amount of equipment for its South Bend, Ind., works, is understood to have covered for the greater part of its requirements by the purchase of used machinery which was picked up in various sections of the country, but some additional machinery equipment remains to be placed. A canvass of the Detroit automobile field indicates a good volume of buying of machinery during the fall to increase production capacity for next season's cars. Most of the leading automobile makers are now far behind on deliveries, and they expect their business during 1920 will be very heavy.

The Superior Foundry Co., Cleveland, will make some extensions and alterations to its foundry and also erect a two-story and basement building, 75 x 200 ft., to be used for its core department. The contract for the building has been awarded to the Austin Co., Cleveland.

A few three-story and basement knitting mill plant will be erected in Cleveland by the Bamberger-Reinthal Co. The building will be 76 x 280 ft. Christian, Schwarzenberg & Gaede are the engineers.

The Willard Storage Battery Co., Cleveland, will erect a two-story factory addition, 35 x 136 ft.

The Austin Co., industrial engineer and builder, Cleveland, has taken a contract from the Jaxon Steel Products Division of the General Motors Co., Jackson, Mich., for a factory building, 100 x 120 ft., one from Kern Dodge, Morris Building, Philadelphia, for a foundry building, 116 x 180 ft., and another from the Continental Fiber Co., Newark, Del., for a two-story building, 60 x 240 ft.

The Interlake Engineering Co., Cleveland, will build a two-story punch shop, 45 x 80 ft.

The Jones Bros. Structural Steel Co., Ravenna, Ohio, has been organized to engage in the business of fabricating

and erecting structural steel, and has secured quarters in a building formerly occupied by the John F. Byers Machine Co. The Jones Co. is a partnership composed of J. A. and B. F. Jones of Alliance, Ohio, and G. G. Jones of Beaver Falls, Pa.

The Woodard Machine Co., Wooster, Ohio, has disposed of its pump manufacturing and repair business, which it acquired some time ago from the Canton-Hughes Pump Co., to the Chalmers Pump & Mfg. Co., Lima, Ohio.

The Buckeye Aluminum Co., Wooster, Ohio, has placed a contract for a three-story factory building, 110 x 140 ft.

The Wagner Mfg. Co., Sidney, Ohio, has placed a contract for the erection of a three-story machine shop, 50 x 70 ft., and a two-story foundry, 50 x 80 ft.

The Fate-Root-Heath Co., Plymouth, Ohio, formed by the merger of the J. D. Fate Mfg. Co. and the Root-Heath Mfg. Co., is making some extensions to its plant, including the erection of a foundry building. John A. Root is president of the new company, C. E. Heath vice president, and H. R. Sykes treasurer.

The Ohio Machine & Tool Co., Kenton, Ohio, will enlarge its plant by an addition, 80 x 41 ft. The contract has been placed with the Bellefontaine Bridge & Steel Co.

Russell & Co., Massillon, Ohio, will enlarge its plant by the erection of a two-story foundry building, 35 x 190 ft. The steel will be erected by the Massillon Bridge & Structural Co.

The Will-Burt Co., Orville, Ohio, maker of tools and vises, is planning the erection of a new plant which will include a machine shop, 60 x 100 ft., a pattern shop, 30 x 40 ft., and a blacksmith shop, 40 x 60 ft. New machinery will be installed.

The O'Neil Machine Co., Toledo, Ohio, has purchased a 3-acre site at West Bancroft and Auburn streets, Toledo, and will build a new two-story brick, concrete and steel factory building, 60 x 200 ft. The company, which now is located in the Toledo Factories Building, manufactures glass-working machinery.

The Roesch Tool Co., 1305 Dorr Street, Toledo, Ohio, has been incorporated with a capital stock of \$20,000 to conduct the business formerly operated under the name of the R. & L. Tool Co.

The Scientific Mfg. Co., Sandusky, Ohio, has been organized with a capital stock of \$500,000, and will manufacture a sectional automobile rim. The company has purchased the plant of the Lake Erie Dry Dock & Mill Co., Sandusky.

The Erie Tire & Rubber Co., Sandusky, Ohio, will receive bids shortly for an additional unit to its plant.

The Garford Mfg. Co., Elyria, Ohio, is in the market for a No. 4 inclinable press and a No. 4 adjustable table press.

The Garford Engineering Co., Elyria, Ohio, has been placed in the hands of S. W. Henson, receiver, following the securing of a judgment by creditors. The business will be continued under the receivership.

The Herman Pneumatic Machine Co., Zellenople, Pa., is inquiring for a horizontal boring mill and a 34 or 36-in. lathe.

The Zwick & Greenwald Wheel Co., Dayton, Ohio, established in 1859, has changed its name to The Automotive Wood Wheel Co. of America. For some time, it has been manufacturing automobile wheels in connection with its buggy wheel business, but is now installing additional new machinery, and henceforth will manufacture automobile wheels for pleasure cars, exclusively. The change will not effect any of its old employees.

Detroit

DETROIT, July 28.

The George W. Blake Mfg. Co. has been organized in Wyandotte, Mich., to succeed the Blake Filling Machine Co. and will manufacture the old-style Blake filling machines as well as more recent types invented by Mr. Blake, together with the Blake pouring spout. Officers are Charles Gartner, president; Stephen T. Orr, vice president; W. Leo Calahan, secretary; Albert T. Burns, treasurer, and George W. Blake, general manager.

Rebuilding work on the Pontiac Spring Works plant sections recently destroyed by fire has been started. The administration building is the first to be erected, and is of brick, two stories, 57 x 63 ft. The building will be completed in about 45 days. Work on the other part of the plant will be started within the next 10 days. Plans have been approved for this section by B. A. Litchfield, general manager, and officials of the Standard Parts Co., Cleveland.

The Palace Lamp Corporation is a new industry in Benton Harbor, Mich., and manufactures a complete line of metal floor and table lamps. Between 75 and 100 men are

employed. R. K. Witz is president of the company; Samuel Simon, secretary, and Harry Simon, treasurer.

The McMullen Machinery Co., Grand Rapids, Mich., has increased its capital stock from \$30,000 to \$75,000.

P. McDonald, proprietor of the Grand Rapids Boiler Works, Mich., has sold his interests to R. C. Loosemore and A. A. Brown, who will continue the business. The new proprietors had been with Johnson Bros. at Ferrysburg, Mich.

Two new steel storage buildings are to be added to the equipment of the Jackson Steel Products Co., Mich., to be extensions of plants Nos. 1 and 2. The smaller building will measure 60 x 115 ft. and the other 121 x 140 ft. Both will be of steel, glass and brick construction, and together will cost about \$70,000. It is expected they will be completed within 30 days. These buildings are only a small part of the extensions planned.

The Production Castings Co., recently organized in Ann Arbor, Mich., will start with a capacity of 50 tons a day. The company will turn out castings for the Economy Baler and Ann Arbor Machine companies.

Indianapolis

INDIANAPOLIS, July 28.

The Ligonier Auto Body Co. has been incorporated at Ligonier, Ind., with \$135,000 capital stock, to manufacture automobile bodies. The directors are Alexander Weiss, Maurice Loeb and Sigmund Lieb.

The Dunn Motor Device Co. has been incorporated at Indianapolis, with \$50,000 capital stock, to manufacture auto parts. The directors are Henry F. Dunn, Benjamin D. Aufderheide and George H. Rosselo.

The Wm. F. Hartig Plow Co., Evansville, Ind., has increased its capital stock from \$40,000 to \$50,000.

The Modern Refrigerator Co., Peru, Ind., has increased its capital stock from \$25,000 to \$100,000.

The Sefton Mfg. Co., Anderson, Ind., has notified its 400 employees of a new working schedule of a 50-hr. week instead of 55, with the same wages as under the old schedule, which means a Saturday half-holiday.

The Nordyke & Marmon Co., Indianapolis, manufacturers of automobiles and flour milling machinery, will build an assembling room for motors, to cost \$90,000. The building will be of brick and steel, one story, 802 by 100 ft. Other proposed additions will cost \$350,000.

The Weigle Machine Tool Co., Peru, Ind., capitalized at \$80,000, has elected Clifford Weigle, A. L. Meck, F. X. Gartland, Harry B. Fox and H. P. Sullivan, directors.

The Indianapolis Wire Hoop Co. has been incorporated at Indianapolis, with \$10,000 capital stock, to manufacture wire hoops. The directors are Emmet M. Starns, H. Douglas and G. W. Whittington.

The directors of the Laurel Motors Corporation, Anderson, Ind., reelected Charles E. Hayes general manager at the annual meeting. Extensive additions will be made to the plant next season.

The Hess Mercury Carburetor Mfg. Co. has been incorporated at Kokomo, Ind., with \$50,000 capital stock. The directors are Willis C. Hess, M. E. Talbert and P. Rector.

Cincinnati

CINCINNATI, July 28.

Domestic orders for machine tools are still coming in at a steady rate, but no large lots have been bought lately and orders are principally for one or two machines. Medium sized lathes seem to be in better demand than any other kind of tools. Makers of metal shearing and forming machinery are very busy and are operating their plants at full capacity. Export inquiries are quite numerous, but recently only a comparatively small number of them have developed into orders.

Second-hand machinery dealers report business as improving. As a rule, used machine tools do not stay on the market very long. Boiler and tank makers are busier. The jobbing foundries have about all the work they can handle promptly and are not now harassed by labor troubles, although there is a scarcity of skilled molders.

The Pollak Steel Co. has not given out full particulars as to the contemplated improvements to its plant at Carthage, a suburb, but definite information concerning the necessary equipment to be provided is expected at an early date.

Quite a number of automobile tire plants in Ohio are either now under construction or are contemplated, and this has brought out a big demand for medium sized boring and turning mills for making tire molds.

The Stuebing Truck Co., Winton Place, Cincinnati, has leased a large building on Court Street that will enable it to

increase its present output of lift-trucks nearly 75 per cent. The company's offices are in the Fosdick Building.

The American Laundry Machinery Co., Norwood, Ohio, will erect an addition, 160 x 230 ft., to its plant. Considerable new equipment will be required, including a traveling crane.

The Globe-Wernicke Co., Norwood, Ohio, has let a contract to the H. C. Hazen Construction Co., Cincinnati, for an addition to its plant that will contain 195,000 sq. ft. of floor space. The company manufactures wood and steel office furniture and fixtures.

The Hamilton Metal Products Co., Hamilton, Ohio, maker of hardware specialties, is making a two-story addition to its plant on North B Street that will nearly double its present capacity.

The Duplex Mill & Mfg. Co., Dayton, Ohio, has let contract for an addition to its woodworking department that will be 61 x 63 ft., of fireproof construction, and an addition to its foundry that will be 45 x 50 ft.

The Dayton Reliance Tool & Machine Co., Dayton, Ohio, has increased its capital stock from \$50,000 to \$250,000. The company manufactures chucks for machine tools, and has plans under way for removing to another building.

The National Stove Repair Co., Miamisburg, Ohio, has increased its capital stock from \$50,000 to \$100,000 and contemplates removing its plant to Dayton, Ohio.

The Western Tool & Mfg. Co., Springfield, Ohio, has acquired a seven-acre tract of land adjoining its plant on which it will erect a building at a later date. The company manufactures machine tool accessories.

The Columbus Tire & Rubber Co., Columbus, Ohio, has let a contract to the Cummins & Blair Co., Cleveland, for its proposed plant. The main building will be 75 x 300 ft., two stories, with an L, 25 x 60 ft., all of reinforced concrete construction.

The Hobart Mfg. Co., Troy, Ohio, has decided on a third addition, 50 x 96 ft., to its plant. It will be used as a tinning and heat treating department.

Milwaukee

MILWAUKEE, July 28.

A feature of the machine tool market is the large number and encouraging tone of inquiries being received by local manufacturers and dealers. While none of these inquiries involves what may be called a large lot, improvement in demand is indicated by the fact that single tools are growing into small lots. This is taken to mean less hesitancy on the part of metal-working concerns to proceed with plans for increasing facilities which are urgently needed but have been delayed pending developments in the general situation. Milling machine makers regard the situation with considerable satisfaction and express the opinion that the business of the coming four or five months will be of sufficient volume to keep shops busy at a comfortable capacity until the end of the year.

The Clum Mfg. Co., 23-25 Erie Street, Milwaukee, manufacturer of electric controlling devices, will effect a large increase in its facilities about Oct. 1, when it takes possession of the four-story building, 100 x 150 ft., at First and National avenues, which was purchased July 24 for a consideration of \$125,000. The building, formerly used as a department store, will be strengthened and remodeled. A large list of new machine tools will be purchased, but definite requirements have not been detailed. The present equipment will be moved to the new factory. Officers of the Clum company are: President and general manager, Val Fina; vice-president and sales manager, Radcliffe Dennison; secretary-treasurer, Lynn S. Pease.

The Stewart Tractor Co., a new Wisconsin corporation with an authorized capital stock of \$500,000, has definitely decided to locate its proposed new plant and make its headquarters at Waupaca, Wis. An option has been secured on 45 acres lying along both sides of the main line of the Soo road. Plans are in preparation for the first unit, to consist of a general manufacturing and assembling building, 88 x 220 ft., of brick, concrete and steel, work on which will begin about Aug. 15. The principal product will be a gas tractor adapted especially to farm and road construction work, designed and patented by Alexander Stewart of Clintonville, Wis. C. C. Wayland, Waupaca, is secretary.

The Milwaukee Department of Public Works has accepted the bid of the Allis-Chalmers Mfg. Co., Milwaukee, for furnishing and installing a 20,000,000-gal. vertical triple pumping engine in the North Point station of the municipal water works at \$225,000. The city's estimate of the cost was \$240,000 to \$250,000. There were only two bidders, the other being the Worthington Pump & Machinery Corporation, which made a price of \$235,000.

The Standard Steel Corporation, 491 Virginia Street, Milwaukee, has awarded the general contract to Bentley Bros., 403 Merrill Building, for the erection of its new and permanent works, 120 x 150 ft., on Calhoun place, between Chambers and Burleigh streets, on the Chicago, Milwaukee & St. Paul main line tracks. The company manufactures steel barn and farm equipment, concrete mixers, etc. Much new machine tool equipment will be purchased for the new plant, which will be ready to begin operations about Oct. 15. E. J. DeGunther is president and treasurer.

The Koehring Machine Co., Milwaukee, manufacturer of concrete mixers and paving outfits, has awarded the contract for the construction of a new brick, steel and concrete erecting shop and office building, 75 x 326 ft., to H. Schmitt & Son, 430 Farwell Avenue, and the structural steel work, involving 150 tons, to the Wisconsin Bridge & Iron Co. The Koehring works are located at Thirty-first Street and Concordia Avenue. William J. Koehring is president.

The Motor Castings Co., Milwaukee, has let the general contract for the erection of its new gray iron and semi-steel casting shop in West Allis to Riesen Bros. Co., 425 East Water Street. It will be 111 x 180 ft., of brick, steel and concrete, with one cupola and provision for a second, and is to be ready Sept. 15. Gustave Anderson is vice-president and general manager. Temporary offices are located at 86 Michigan Street, Milwaukee.

The George Diamond Economy Process, DePere, Wis., has awarded the general contract to W. E. Ule & Co., Grand Rapids, Wis., for the erection of a machine shop, power plant and paper mill, previously noted. The investment in buildings, machinery and equipment will be about \$225,000. The manufacture of paper box making machines will be the principal activity. L. A. DeGuere is consulting engineer.

Sam Schwartz & Son, Two Rivers, Wis., wholesale dealers in scrap metal, have plans for a smelting and refining plant for aluminum, brass, copper and other metals, which is estimated to cost about \$25,000. Work will begin about Aug. 1.

The Rhinelander Iron Works, Rhinelander, Wis., sustained a heavy loss by fire which almost totally destroyed its foundry July 24. The loss is partly covered by insurance. Peter Dedler, proprietor and manager, intends to rebuild.

The Stevenson Mfg. Co., Barton, Washington county, Wis., has been incorporated with an authorized capital stock of \$100,000 to engage in the manufacture of hardware specialties, barn equipment, etc., designed and patented by Charles M. Stevenson, formerly of Chicago. The incorporators are Mr. Stevenson, J. J. Fellenz and J. B. Matenauer, of Barton. Work will begin at once on a one-story factory, 80 x 130 ft. Inquiry is being made for equipment.

Charles H. Burgess & Son, Beloit, Wis., operating a gray-iron foundry and manufacturing stoves and ranges in the former Doylair Stove Works at South Beloit, Ill., have incorporated the business under the style of South Beloit Stove & Mfg. Co., with a capital stock of \$50,000. The incorporators are Charles H. Burgess, L. G. Burgess and R. B. Williams.

The Great Lakes Malleable Co., Milwaukee, has let a contract to John L. Stanage, consulting engineer, 144 Oneida Street, for remodeling and enlarging the former Maynard steel foundry at 710-716 Reed Street, which will be equipped for malleable casting processes. W. T. Hersher is president and general manager.

The Madison Tool & Stamping Works, Madison, Wis., is the style of a new corporation organized with a capital stock of \$10,000 by W. L. Woodward, G. A. Benson and T. E. Rosten, all of Madison, to engage in the manufacture of tools, dies, stampings, wood and metal patterns, etc.

The Oshkosh Washing Machine Co., Oshkosh, Wis., has plans for a one-story brick and concrete factory addition, 80 x 200 ft., costing about \$40,000 with new machinery.

The Milwaukee Talking Machine Mfg. Co., 416-418 Fourth Street, Milwaukee, has leased the seven-story light manufacturing building at 241-245 East Water Street, and will remodel it for the manufacture of phonographs, cabinets and other musical instruments. The new plant affords 100,000 sq. ft. Much new metal and woodworking equipment is being purchased. Stanley L. Roth is secretary and treasurer.

The Wisconsin Valley Sheet Metal Works, Wausau, Wis., and the Seeger Mfg. Co., Chicago, have effected a consolidation under the name of Metal Products Co., which has been incorporated with a capital stock of \$25,000 by Paul Krueger, Max H. Seeger and Patrick Stone. The Wisconsin plant makes general sheet metal products and the Seeger company specializes in oil-burning stoves for private garages and other domestic and farm use.

Redner & Essen, 938 Robinson Avenue, Milwaukee, will build a one-story brick machine shop, 40 x 85 ft., for general machine and automotive repairing.

The Hamilton-Beach Mfg. Co., Racine, Wis., has awarded contracts for the erection of a \$60,000 factory addition, two stories, 60 x 125 ft., to be used as a nickel plating shop and

finishing room. Fred J. Osius is president and general manager.

The Milwaukee Mfg. Co., Milwaukee, has filed articles of incorporation. The capital stock is \$200,000 and the objects to carry on a general machinery and manufacturing business. The incorporators are Edward Strauss, L. V. Schneider and Max J. Leuterman, attorney, 22 Metropolitan Block.

Adam Ahrendt, 557 Seventy-third Avenue, West Allis, Milwaukee county, has taken as a partner in his machine shop business Frank Gruetzmacher, formerly foreman of the machine shop of the Federal Malleable Co., Milwaukee. A one-story addition, 50 x 50 ft., will be erected to the Ahrendt shop.

The Racine Auto Tire Co., Racine, Wis., is contemplating the erection and equipment of a new steam generating plant and boiler house costing about \$40,000. A. N. Becker is chief engineer.

Smart & Phillips, 601 University Avenue, Madison, Wis., have broken ground for a new public garage and repair shop, 73 x 165 ft., of which a space of 40 x 65 ft. will be equipped as a machine shop.

The M. J. Skubal Co., Milwaukee, has been incorporated with a capital stock of \$15,000 to engage in the general welding and machinery repair business at 204 Becher Street. The incorporators are Matthew J. Skubal, Joseph H. Stika and James Talatzko.

The Kahlenberg Bros. Co., Two Rivers, Wis., is working on a number of export orders of considerable size for crude oil engines for marine and land use. Shipments last week included two 100-hp. engines to Holland and two of the same capacity to Cuba.

The Valley Motor Car Co., Menasha, Wis., will build a two-story garage and machine shop, 60 x 100 ft., at 148-150 Main Street, at a total cost of \$15,000.

Ludwig and Richard Niememzyk and Anton Ficht, West Allis, Wis., will build a one-story machine shop, 40 x 140 ft., at Fifty-second and Greenfield Avenues.

Stanley F. Kadow, architect, 451 Mitchell Street, Milwaukee, is preparing plans for a one-story fireproof garage and machine shop, 70 x 115 ft., to be built on the south side. The name of the owner is withheld for the present.

The Plankinton Packing Co., Milwaukee, a subsidiary of Swift & Co., Chicago, will build a new cold storage warehouse, requiring new refrigerating and ice machine equipment and make other improvements estimated to cost \$500,000. C. H. Kane, Chicago, is consulting engineer. H. S. Culver is vice-president and general manager at Milwaukee.

The Board of Education, West Bend, Wis., has engaged Foeller & Schober, architects, Green Bay, Wis., to design a \$75,000 addition to the high school to provide manual training instruction facilities.

The Wisconsin Shipbuilding & Navigation Corporation, Kewaunee, Wis., has started work on the construction of its new plant, which will embrace a drydock, machine shop, boiler shop, etc. The Great Lakes Dredge & Dock Co. is in charge of present operations and the general contract is in charge of the Thomas Engineering Co., New York. E. T. Thomas is president of the Kewaunee company.

Contracts have been let by the Samson Tractor Co., Janesville, Wis., for a foundry plant which will cover an area no less than 322 x 500 ft. in size. The contract has been awarded to the Frank D. Chase Co. The building will adjoin the present Samson foundry, and will include a pattern shop, machine shop, sand bins, core room, cupola room, foundry and service department. The contract provides for completion by January 1. About 2500 tons of steel will be needed. In a separate building will be housed a 4000-hp. heating plant to furnish heat through underground pipes to both the old and new buildings. Several additional barracks will also be constructed to care for the added working force.

St. Louis

St. Louis, July 28.

The Super-Power Piston Ring Corporation, St. Louis, has been incorporated with a capital stock of \$100,000 to manufacture piston rings and motor accessories. O. W. Hanson and F. W. Norburg, Salina, Kans.; T. W. Whinnery, Charles Peters and J. C. Hainer, St. Louis, are incorporators.

The Pana Engine & Mfg. Co., Pana, Ill., has been organized with a capital stock of \$50,000 to manufacture steam engines and machinery. J. E. Jones, Julius Broehl and P. L. McKee are incorporators.

Bids have been asked by the Zone Supply Office, St. Louis, for coupling straps and by Zone Supply Office, Jeffersonville, Ind., for 2500 blacksmiths' anvils, weight 70 to 75 lb. each.

The Victory Brass & Mfg. Co., St. Louis, has been incor-

porated under the laws of Missouri with a capital stock of \$7,000 to establish a brass working plant.

The Vulcan Spark Plug Mfg. Co., St. Louis, has been incorporated under the laws of Missouri with a capital stock of \$10,000 to manufacture spark plugs, etc. The incorporators are F. C. Petty, F. Fox and H. H. Fleer.

The Anguilla Cotton Oil Mill Co., Anguilla, Miss., has been organized with \$100,000 capital by E. T. Lindsay, J. C. Itainer and others and will establish a cotton oil mill.

The Helgason Bros., William H. and Alex Fitz-Hugh and others, of Vicksburg, Miss., have bought the Churchill compress and will add about \$50,000 of new machinery.

The Michigan City Foundry Co., St. Louis, Mo.; Albert F. Fort, Michigan City, Ind., and others interested will equip a foundry. J. M. Hirschten, 5777 DeGiverville Avenue, St. Louis, is in charge.

The Great American Refining Co., Cedar Grove, La., F. B. Grevenberg engineer, will equip a refinery of 5500 bbl. daily capacity.

The Walker Refining Co., Chickasha, Okla.; Alex Walker, Lawton, Okla., president, will equip an oil refinery of 2000 bbl. daily capacity.

The Sapulpa Refining Co., Sapulpa, Okla., will improve its oil refinery at a cost of about \$1,000,000 for machinery and additional buildings.

Abram Kaplan, Crowley, La., is in the market for 1000 h.p. in engines and pumping equipment to irrigate about 1000 acres of rice land.

The Rex Spray Co., Finance Bldg., Kansas City, Mo., will equip a plant for the manufacture of spraying machinery and similar apparatus.

The Deignan Motor Co., Oklahoma City, Okla., has been organized by John A. Deignan and others with a capital stock of \$100,000 for the manufacture of motors.

The Pacific Northwest

SEATTLE, July 22.

According to indications the readjustment demands of peacetime are reacting favorably upon Seattle industries. In many instances, the modifications caused by war have only enhanced the growth of local plants, as many industries which were confining their efforts to one or two lines have found that by meeting war demands for new lines of manufacture, profitable new branches of manufacture have been worked up. This is particularly true of several large plants which formerly devoted their entire efforts to steel and iron stove pipe, but who are now manufacturing a line of bolts and nuts, that in some cases has developed into the main endeavor of the business.

Lumber mill operators of Washington are rejecting orders and heavily restricted production is certain during July and August, because of the necessity of closing down for repairs. Mill stocks are depleted, and the industry, during the past week, has been forced to an intensified policy of selective order acceptance. The car shortage during the past 10 days has been cut down fully 50 per cent, and it is considered possible that it may be reestablished on a normal basis in another 10 days. However, the early fall is expected to bring another severe car shortage. A disturbing factor in the trade is the persistent reports of freight advances and the mills are adopting the policy of accepting all new business subject to future freight advances.

The labor turn-over in the local shipyards is unusually large, due, it is claimed, to the fact that farmers in the Inland Empire are paying more than the present shipyard wage for unskilled workers.

The White Salmon Valley Fruit Growers' Association, White Salmon, Wash., plans the construction of a cold storage plant, 64 x 64 ft., of hollow tile, to cost \$10,000.

The Standard Box & Lumber Co., Scofield, Ore., is preparing to rebuild its sawmill, planing mill, power house and electric lighting plant, which were destroyed in June. The new plant will be larger than the old, and will be equipped with the most modern machinery.

The city council of Seattle has authorized a bond issue of \$1,250,000, to be used in extensions to the city's steam plant on Lake Union. Plans call for the immediate construction of a concrete addition, 80 x 120 ft., to house the new unit of the steam plant. A traveling crane will be installed. The structure will cost \$85,000 and the remainder of the appropriation will be expended for machinery and equipment.

The Albina Engine & Machine Works, Portland, it is reported, have closed negotiations for contracts for four steel steamships of 6000 deadweight tons, for Scandinavian interests. The company will have to make certain changes at its plant, as it has been building 3800-ton ships.

The Paragon Tool Co., Seattle, plans the erection of a

new factory building to cost \$50,000. The company has specialized in the manufacture of shipyard tools, but now plans the addition of a line of automobile parts and miscellaneous tools.

The Willamette Iron & Steel Works, Portland, recently closed contracts with the Todd Shipbuilding Co., Tacoma, for nine Scotch marine boilers, and four additional boilers for the Foundation Co. at Victoria. The company is now working on a previous order for 20 boilers for the Foundation Co.

Wells & Wade, Wenatchee, Wash., have purchased a large site in that city, on which they will erect a new plant for designing and constructing pumping plants, manufacturing power sprayers and irrigation pipe.

The Tukens-Hazel Mining Co., Libby, Mont., is completing plans for its proposed power plant and 200-ton concentrator. Surveyors have started running the lines. The concentrator will cost about \$240,000 and the power plant \$200,000.

The American Aircraft Corporation, Port Angeles, Wash., has let contract for its proposed aeroplane plant. The main building will be 100 x 200 ft., and will cost \$50,000.

The Western Cordage Co., New Westminster, B. C., has secured the site for its proposed cordage plant, and work will be undertaken at once. The plant will cost about \$100,000, and will employ 90 men.

Canada

TORONTO, July 28.

The Electric Mfg. Co., Alexander Street, Vancouver, B. C., will erect a manufacturing building 50 x 100 ft. on a site which has been leased on Industrial Island from the Harbor Commission. It will be of mill construction. Machinery for the manufacture of heavy type slate back switches and also the new type of externally operated switches has been ordered.

Gardiner & Mercer, Vancouver, B. C., architects, have been receiving bids for the construction of a new plant for the Mainland Engineering Co. to be erected on Coal Harbor. Work will be started at an early date.

The Sayre & Holly Lumber Co., Chipman, N. B., whose plant was recently destroyed by fire with a loss of \$140,000, will rebuild its plant.

The Dominion Tire Co., 149 Strange Street, Kitchener, Ont., will build a factory addition to cost \$150,000. A. Y. Copeland is in charge.

The Three Rivers Shipyard Co., Three Rivers, Que., has started work on a machine shop on Notre Dame Street.

Casper Braun, King Street, has the general contract for the erection of a factory at Kitchener, Ont., for Ames, Holden, McCready, Ltd., 1221 Mount Royal Avenue, East, Montreal, Que., to cost about \$1,000,000.

The Anchor Cap & Closure Corporation of Canada, Ltd., 50 Dovercourt Road, Toronto, Ont., has awarded the general contract to L. E. Dowling, 167 Yonge Street, for the erection of a manufacturing plant to cost \$50,000.

Tenders will shortly be called for the erection of a foundry and machine shop for the United Iron & Machinery Co., Halleybury, Ont., to cost about \$100,000.

A foundry to cost \$75,000 is to be erected at Ottawa, Ont., by the Beach Co., Spencer Street.

Plans are being prepared by C. A. P. Turner for the erection of a ten-story factory building, 60 x 280 ft., for the Northern Aluminum Co., Toronto, Ont.

The Welland, Ont., plant of the Canadian Steel Foundries has been closed down and the machinery shipped to Montreal, Que.

Work is under way on the erection of a manufacturing plant at Three Rivers, Que., for the Page Wire Fence Co., to cost \$150,000.

The United Portland Cement Co., Ltd., Brantford, Ont., has been incorporated with a capital stock of \$200,000 by Robert M. Rodney, Morley A. Pettit, John W. Robinson and others to manufacture cement, limestone, crushed stone, builders' supplies, etc.

The Automatic Gage & Supply Co., Ltd., Montreal, has been incorporated with a capital stock of \$100,000 by Jacob Nicol, Wilfrid Lazure, Joseph S. Couture and others, all of Sherbrooke, Que., to take over the patent granted to Simeon Gagnon and Alfred Dian, both of Montreal, in a gasoline indicator, and to manufacture machinery and motor vehicles.

The Battery Engineering & Supply Co., Ltd., Ottawa, Ont., has been incorporated with a capital stock of \$50,000 by Arthur Ellis, Redmond Code, Marie K. Herbert and others to manufacture motor cars, batteries, machinery, electrical supplies, etc.

The Continental Storage Battery, Ltd., Ottawa, Ont., has been incorporated with a capital stock of \$50,000 by Nelson

C. Kerr, Charles E. Taylor, Alexander E. Bannerman and others.

The Chase Tractor Corporation, Ltd., Toronto, Ont., has been incorporated with a capital stock of \$2,000,000 by James L. Ross, 72 Isabella Street; Arthur W. Holmested, room 43, 20 King Street East; Albert R. Kinnear and others.

Soren Brothers, Ltd., Toronto, Ont., have been incorporated with a capital stock of \$250,000 by Mores Soren, 545 King Street West; Louis Soren, Alfred Branson and others to manufacture tinware and granite ware, etc.

The Dayton Airless Tire of Canada, Ltd., Toronto, Ont., has been incorporated with a capital stock of \$200,000 by Kenneth A. McRae, 1917A Queen Street East, and others to manufacture automobile tires, inner tubes, rubber products, etc.

The Wilson Motor Body Co., Ltd., Toronto, Ont., has been incorporated with a capital stock of \$40,000 by Henry H. Davis, room 25, 10 Adelaide Street East; John R. Rumball, 65 Charles Street West; Edward H. Brower and others to manufacture automobile bodies, motor cars, engines, machinery, motors, tools, etc.

The Interchangeable Counterbore & Tool Co. of Canada, Ltd., Walkerville, Ont., has been incorporated with a capital stock of \$200,000 by John A. Ford, Clarence B. Kershaw, Floyd J. Stocking and others to manufacture tools and machinery.

The L. & P. Mfg. Co., Ltd., Niagara Falls, Ont., has been incorporated with a capital stock of \$50,000 by William LaBombard, Niagara Falls, N. Y.; Alexander W. Patterson, George W. Mortimer and others of Niagara Falls, Ont., to conduct a general foundry business.

Contracts have been let by the Lang Mfg. Co., Guelph, Ont., for the erection of a new machine shop on the Harris Street side of its present plant. The company, which conducts a general machine shop business, proposes taking up other lines of manufacture.

The Wilt Twist Drill Co. of Canada, Ltd., Walkerville, Ont., is in the market for two No. 2-B Cincinnati universal milling machines.

The plant of the Brunner Mond Co., Amherstburg, Ont., subsidiary of the Solvay Process Co., Detroit and Syracuse, has been closed down until labor conditions become settled. Several hundred men are affected.

Canadian Engines, Ltd., Dunville, Ont., manufacturer of stationary and portable gas and gasoline engines, grain grinders and saw frames, practically closed down during the war, has resumed operations.

The former H. Boker & Co., Inc., Montreal, is now carrying on business under the name of the Pilot Steel & Tool Co., Ltd. It will be affiliated with the H. Boker Co., New York, representing the latter in Canada. The Pilot company will act as sole agents in Canada for Jonas & Colver, Ltd., Sheffield, England, makers of high-speed steel, hot and cold-rolled tool steel, circular saws, planer knives, files, etc. The directorate of the new concern will be practically identical with that of the old company. F. E. Rejall, Canadian manager for a number of years, will henceforth act as vice-president and director, and continue the management as heretofore.

The Thomas Davidson Mfg. Co., Montreal, is building a large addition to its plant on Delisle Street, to take care of its rapidly increasing business. The gray-iron foundry work has been discontinued at the main plant and a new foundry 74 x 100 ft. is being built at Turcot, adjoining the company's steel plant.

A company represented by Mr. Rittenhouse, Financial Advertising Co., room 40, Toronto Stock Exchange Building, Toronto, is receiving bids for paper-mill power plant at Doncona, Que., to develop 5000 hp.

W. J. Westaway, 72 James Street North, Hamilton, Ont., has been appointed engineer for the building of a \$600,000 factory there for Perritts & Spencer of Bury, England.

H. C. Johnson, Ltd., Bank of Toronto Building, Montreal, has the general contract for a foundry building for the Canadian Steel Foundries, Ltd., 120 St. James Street, Montreal, to cost \$12,000.

The Lignite Utilization Board of Canada, 80 St. Francois Xavier Street, Montreal, Leslie R. Thompson, secretary, will be in the market for the following power-house equipment: Three 125-hp., horizontal return tubular boilers with fittings, for 125 to 150 lb. steam pressure; one steam-driven boiler feed pump; two 200-kv. a. 110-volt, three-phase, 60-cycle, gasoline or oil engine driven emergency lighting sets; one standard underwriters' steam fire pump, 1000 U. S. gal. per min., 125 to 150 lb. steam pressure.

The Canadian Type Registering Scale Co., Ltd., Hamilton, Ont., has been incorporated with a capital stock of \$24,000 by Hazel C. Perkins, Albert St. Pierre and others to manufacture scales and type registering devices, machinery, etc.

Current Metal Prices

On Small Lots, from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

Iron and Soft Steel Bars and Shapes

Bars:	Per lb.
Refined iron, base price	3.37c
Burden's H. B. & S. bar iron, base price	6.10c
Burden's best bar iron, base price	6.30c
Swedish bars, base price	20.00c
Soft Steel:	
3/4 to 1 1/2 in., round and square	3.37c
1 to 6 in. x 3/8 to 1 in.	3.37c
1 to 6 in. x 1/4 and 5/16	3.47c
Rods—3/4 and 1 1/16	3.42c
Bands—1 1/2 to 6 x 3/16 to No. 8	4.07c
Shapes:	
Beams and channels—3 to 15 in.	3.47c
Angles:	
3 in. x 3/4 in. and larger	3.47c
3 in. x 3/16 and 1/2 in.	3.72c
1 1/2 to 2 1/2 in. x 1/8 in.	3.52c
1 1/2 x 2 3/4 in. x 3/16 in. and thicker	3.47c
1 to 1 1/4 in. x 3/16 in.	3.52c
1 to 1 1/4 in. x 1/8 in.	3.57c
7/8 x 3/8 x 1/8 in.	3.62c
3/4 x 1/8 in.	3.67c
5/8 x 1/8 in.	4.47c
1/2 x 3/32 in.	5.17c
Tees:	
1 x 1/8 in.	3.87c
1 1/4 in. x 1 1/4 x 3/16 in.	3.77c
1 1/2 to 2 1/2 x 3/4 in.	3.57c
1 1/2 to 2 1/2 x 3/16 in.	3.57c
3 in. and larger	3.52c

Merchant Steel

	Per lb.
Tire, 1 1/2 x 1/2 in. and larger	3.37c
Toe calk, 1/2 x 3/8 in. and larger	4.25c
Open-hearth spring steel	6.00c
Standard cast steel, base price	14.00c
Extra cast steel	18.00 to 20.00c
Special cast steel	23.00 to 25.00c

Tank Plates—Steel

	Per lb.
1/4 in. and heavier	3.67c

Sheets

Blue Annealed

	Per lb.
No. 8 and 3/16 in.	4.52c
No. 10	4.57c
No. 12	4.62c
No. 14	4.67c
No. 16	4.77c

Box Annealed—Black

	Soft Steel C. R., One Pass, per lb.	Wood's Refined, per lb.
Nos. 18 to 20	5.30c	
Nos. 22 and 24	5.35c	6.55c
No. 26	5.40c	6.60c
No. 28	5.50c	6.75c
No. 30	6.00c	
No. 28, 36 in. wide, 10c higher.		
Wood's Keystone Hammered, 18-24 gage, 9 3/4c; 26-28 gage, 10 1/4c.		

Galvanized

	Per lb.
No. 14	5.85c
No. 16	6.00c
Nos. 18 and 20	6.15c
Nos. 22 and 24	6.30c
No. 26	6.45c
No. 27	6.70c
No. 28	6.75c
No. 30	7.25c
No. 28, 36 in. wide, 20c. higher.	

Corrugated Roofing, Galvanized

2 1/2 in. corrugations, 10c. per 100 lb. over flat sheets.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general headings of "Iron and Steel Markets" and "Metal Markets."

Steel Wire

	Per lb.
Bright basic	5.25c
Annealed soft	5.25c
Galvanized annealed	6.00c
Coppered basic	6.00c
Tinned soft bessemer	7.25c

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

	Per lb.
High Brass Sheet	32c
High Brass Wire	32c
Brass Rod	31c
Brass Tube	46 1/2c

Copper Sheets

Sheet copper, hot rolled, 16 oz., 32 1/2c. to 35c. per lb. base.
Cold rolled, 14 oz. and heavier, 1c. per lb. advance over hot rolled.

Tin Plates

Bright Tin	Grade	Grade	Coke—14x20	Primes	Wasters
	"AAA"	"A"	80 lb.	\$8.30	\$8.05
	Charcoal	Charcoal	90 lb.	8.40	8.15
	14x20	14x20	100 lb.	8.55	8.30
IC	\$11.30	\$10.05	IC	8.80	8.55
IX	13.50	12.00	IX	10.00	9.75
IXX	15.25	13.75	IXX	10.95	10.70
IXXX	17.00	15.50	IXXX	11.90	11.65
IXXXX	18.75	17.25	IXXXX	12.85	12.60

Terne Plates

	Per lb.
8-Lb. Coating 14x20	
100 lb.	\$8.50
IC	8.65
IX	9.65
Fire door stock	11.50

Tin

Straits pig	74c to 75c
Bar	80c to 85c
American pig, 99 per cent.	70c to 72c

Copper

Lake Ingot	26c
Electrolytic	24c to 25c
Casting	24c to 25c

Spelter and Sheet Zinc

Western spelter9c to 10c
Sheet zinc, No. 9 base, casks.....12c; open 13c

Lead and Solder*

American pig lead	6 1/2c to 7c
Bar lead	7 1/2c to 8 1/2c
Solder 1/2 & 1/2 guaranteed	45c
No. 1 solder	40c
Refined solder	34c

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	90c
Commercial grade, per lb.	50c

Antimony

Asiatic	10c
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Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.37c to 39c

Old Metals

The market is firm. Dealers' buying prices are nominally as follows:

	Cents Per lb.
Copper, heavy and crucible	19.00
Copper, heavy and wire	18.00
Copper, light and bottoms	15.50
Brass, heavy	12.50
Brass, light	8.50
Heavy machine composition	18.00
No. 1 yellow rod brass turnings	10.00
No. 1 red brass or composition turnings	14.00
Lead, heavy	5.00
Lead, tea	3.75
Zinc	4.50

are
ents
r lb.
9.00
8.00
5.50
2.50
8.50
8.00
0.00
14.00
5.00
3.75
4.50